

The Iron Age

A Review of the Hardware, Iron and Metal Trades.

Published every Thursday Morning by DAVID WILLIAMS, No. 83 Reade Street, New York. Entered at the Post Office, New York, as Second-Class Matter.

Vol XXXI: No. 11.

New York, Thursday, March 15, 1883.

\$4.50 a Year, Including Postage.
Single Copies, Ten Cents.

The Bower-Barff Process.

BY A. S. BOWER, C. E.*

Any process which has for its object the preservation of iron and steel from rust, and which will make these metals more applicable than they now are to the requirements of mankind, will be sure to meet with attention from members of this Association, and from all those who are either engaged in the extraction of the ore, its reduction to metal, or the subsequent application of the metal itself.

It is, perhaps, not too much to say that with iron and steel rendered secure against corrosion and decay, they will be used to an indefinitely greater extent than they now are. The whole realm of science has, therefore, been explored in the attempt to discover some method by which the formed article may be preserved, leaving its strength undiminished by the destructive action of rust. Paints, oils, varnishes, glazes, enamels, galvanizing, electro-depositing and what is called "in-oxidizing" are among the many systems now in vogue to effect the preservation of iron and steel from the corrosive action of air and water. The object of this paper is to show what may be done in protecting iron and steel from rust by forming upon their surface a film of magnetic oxide by an inexpensive process. It is no new thing to be told that magnetic oxide of iron is unaffected by exposure to the atmosphere or to salt water for any length of time. The black sand of Taranaki, in New Zealand, is a sufficiently good example of this. Doctor Percy has pointed out that the reason why Russian sheet iron is less affected by exposure than ordinary sheet iron is because of a coating of magnetic oxide; but this was not known until Doctor Percy discovered it. That such a coating is produced is quite certain, but it is only an accident of manufacture. To Professor Barff is due the credit of being the first to deliberately undertake to coat iron and steel with magnetic oxide, produced designedly for the purpose of protecting their surfaces from rust. Some 16 or 17 years ago my father was making a series of experiments in the production of heating gases, one set of them being the decomposition of water by passing superheated steam through masses of red-hot iron. He noticed that the iron became less and less active until it ceased to decompose at all, when, on examining it, he saw that it was coated with a kind of enamel. It at once occurred to him, on seeing this, that the process in question might be used to obtain such a coating, but he found, after a few days' exposure of the iron to the atmosphere, that the coating shelled off, and he pursued the matter no further. The iron employed in this case was rusty, but if it had been new my father would in all human probability have been the accidental author of the process which Professor Barff discovered ten years afterward. I only mention this to show how advisable it is to investigate the causes of unexpected effects. Professor Barff's process consists in subjecting iron or steel articles to the action of superheated steam, and when they are at a temperature sufficiently high, three equivalents of iron combine with four of oxygen, forming one equivalent of magnetic oxide, or symbolically $(1) \text{Fe}_3 + 4 (\text{H}_2\text{O}) = \text{Fe}_3\text{O}_4 + 8 \text{H}$.

Upon reading a description of the Barff process in the London Times, it occurred to my father that what the Professor could effect with steam he might also effect with air, and several experiments were made to this end, which, however, were very varied in character, as also were they in the results obtained. The first was made with cast iron by placing the articles to be treated in a cast-iron retort, heated externally, and then passing superheated air over them, and it was successful, while nearly all others afterward were quite the reverse, as sesquioxide of iron in close proximity with the iron, due to the reducing influence of the metal in contact with the sesquioxide at an elevated temperature. The general appearance, however, of iron so treated was disagreeable, to say the least of it. The mode of action I then adopted was to admit a few cubic feet of air into the retort at the commencement of every half-hour, and then to leave the

oxide in close proximity with the iron, due to the reducing influence of the metal in contact with the sesquioxide at an elevated temperature. The general appearance, however, of iron so treated was disagreeable, to say the least of it. The mode of action I then adopted was to admit a few cubic feet of air into the retort at the commencement of every half-hour, and then to leave the

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by first dipping them all into a tank of water of known area, lifting them out, and noticing the amount of water taken out of the tank by the wetted surface, and regulating accordingly a slow, continuous air supply by meter, of course keeping the temperature of the muffle as nearly constant as possible. This, too, was successful; but the same objections applied to that mode of procedure as to the other.

There was commenced a series of experiments with carbonic acid chemically produced by the decomposition of chalk, the idea being that three equivalents of iron would unite with four of carbonic acid, forming one equivalent of magnetic oxide and four of carbonic oxide, if the heat were sufficiently high. This reaction is expressed symbolically thus: $(2) 3 \text{Fe} + 4 (\text{CO}_2) = \text{Fe}_3\text{O}_4 + 4 (\text{CO})$. This is the simplest action that could take place, but it was evident from the results that something quite different was obtained, inasmuch as the coating was very light in color, pleasing to the eye, but easily removed, and in that sense entirely differing from the articles you see before you. This coating, from effects exactly similar and designedly produced by a studied manipulation in the furnaces in successful operation in England, France and here, proves pretty conclusively that carbonic acid, practically pure, produces upon iron, at an elevated temperature, a film which is, in composition, a mixture of FeO and Fe_3O_4 , or, at all events, it is nearer the metallic state than is magnetic oxide. But even supposing that the results obtained by the carbonic acid had been successful as then carried out, the objections referred to concerning the air process would still exist, as external heat and a closed iron muffle would always be necessary. I therefore proposed to use a fuel-gas producer, similar in principle to the Siemens generator, but altered practically to suit other requirements, to burn the combustible gases thus produced with a slight excess of air over and above that actually required for perfect combustion, and to heat and oxidize the iron articles, placed in a suitable brick chamber, by these products of combustion. I also arranged a continuous regenerator of fire-clay tubes underneath the furnace, so that the products of combustion leaving the oxidizing chamber passed outside the tubes, imparting a portion of the waste heat to them, which was taken up by the ingoing cold air passing through their interior on its way to the combustion chamber. I had hoped in this way to be able to so regulate the excess of air over that required for complete combustion as to be able to produce magnetic oxide directly, instead of the lower and useless oxide or combination of oxides produced by carbonic acid alone. I obtained some beautiful results, and some again were unaccountably bad, and I soon found that it was as difficult to regulate the precise amount of oxidation as it first was in the Bessemer process, and I was fortunate enough to hit upon an almost parallel remedy—that is to say, I increased the quantity of free oxygen mixed with the products of combustion, and oxidized the iron articles to excess during a fixed period of generally 40 minutes, when magnetic oxide was formed close to the iron and sesquioxide over all. Then for 20 minutes I closed the air inlet entirely, leaving the gas-valve open, and so reduced the outside coating of sesquioxide to magnetic oxide by the reducing action of the combustible gases alone.

The excess of oxygen in the first instance produces Fe_3O_4 , or sesquioxide of iron, and the under surface of this, being in contact with metallic iron, undergoes reduction to magnetic oxide in the following manner:

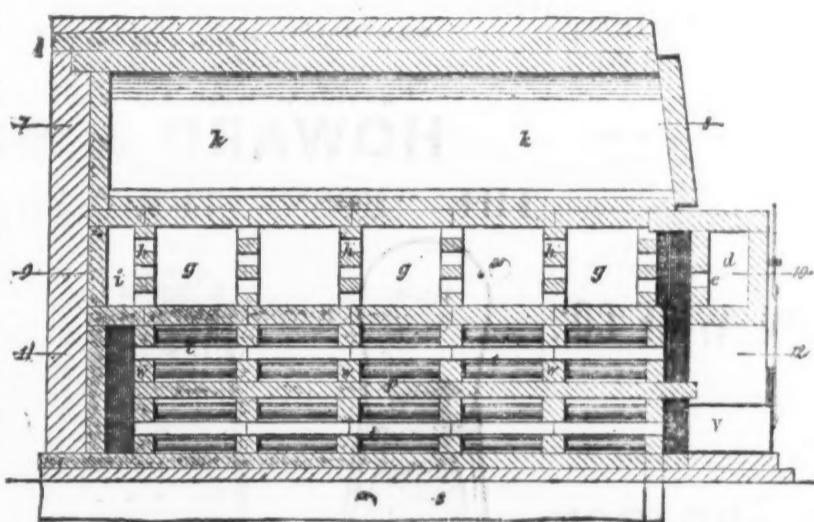


Fig. 1.—Longitudinal Section of Bower Furnace Along Line 1-2 in Fig. 3.

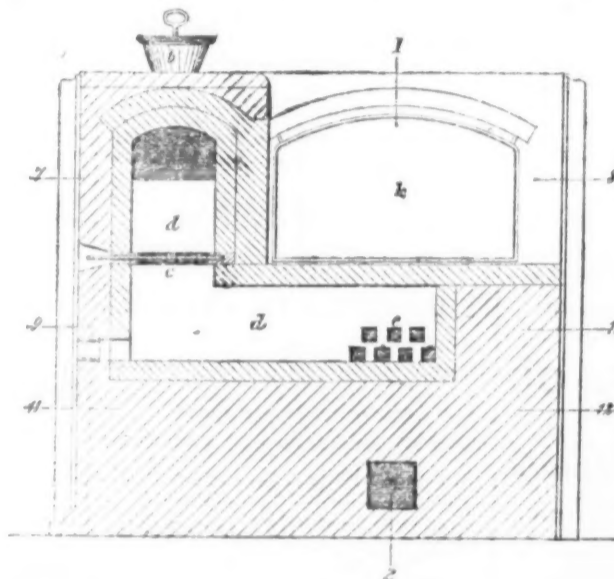


Fig. 2.—Transverse Vertical Section Along Line 3-4 in Fig. 3.

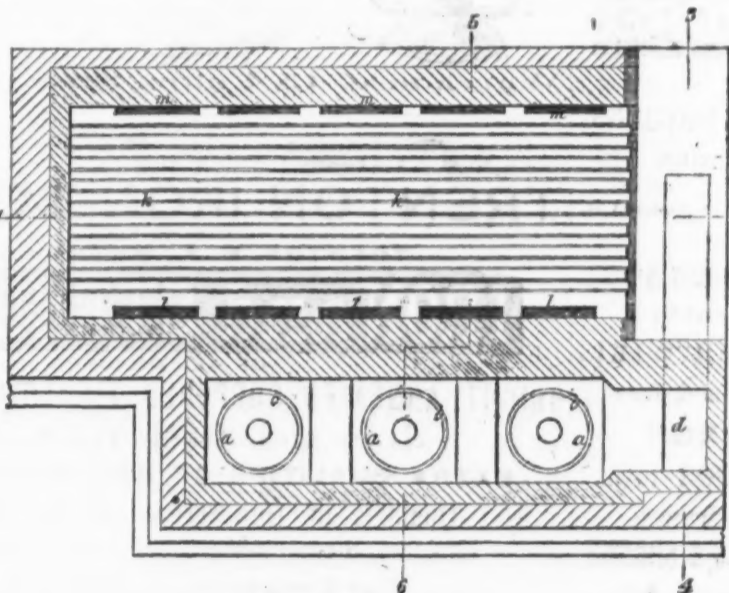


Fig. 3.—Horizontal Section Along Line 7-8 in Figs. 1, 2 and 5.

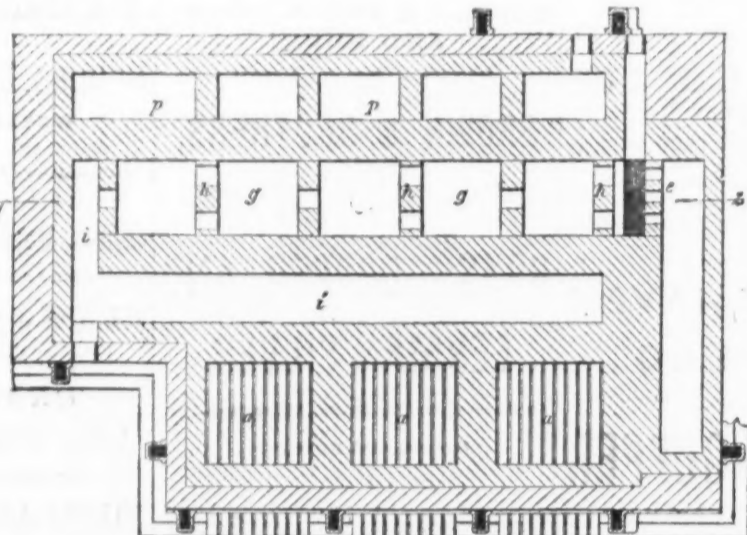


Fig. 4.—Horizontal Section Along Line 9-10 in Figs. 1, 2 and 5.

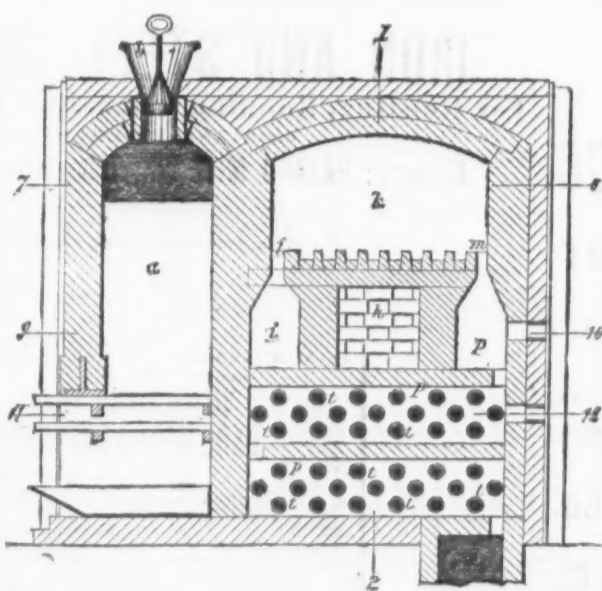


Fig. 5.—Transverse Vertical Section Along Line 5-6 in Fig. 3.

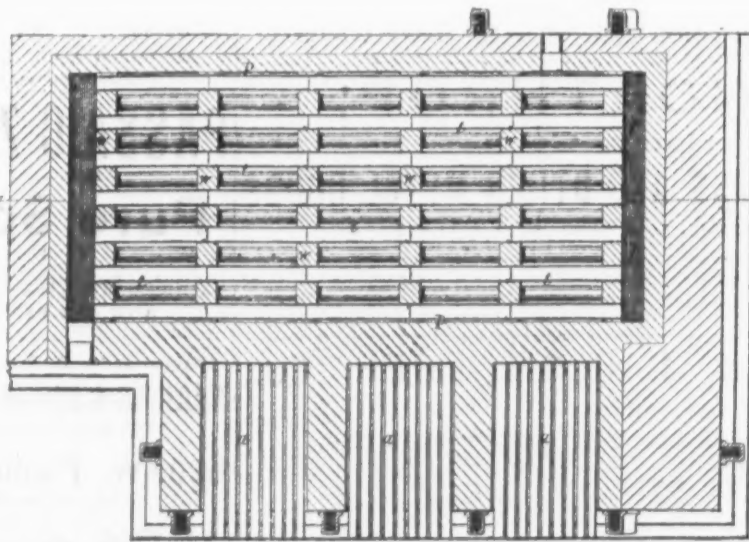


Fig. 6.—Horizontal Section Along Line 11-12 in Figs. 1, 2 and 5.

THE BOWER-BARFF PROCESS FOR THE PRESERVATION OF IRON AND STEEL.

was copiously produced as well as the magnetic. Another experiment was made by placing a bar of polished cast iron in the main duct of superheated air to a blast furnace, and this, though covered with a red sesquioxide powder and easily brushed off, had a thin, but very firm and tenacious, coating of magnetic oxide in contact with the iron. This bar has been exposed to the weather ever since, or over four years, without the slightest appearance of rust. Ultimately, when thinking over the fact that air is oxygen and nitrogen in mechanical

cessful experiments was 300 or 400 times more than was actually necessary. The reasons also why the first experiment was successful were that a great number of articles were in the muffle, that a very high heat was employed, and that the retort had been previously used for coal-gas making, and had a deposit of carbon in it, which to a great extent neutralized the effect of the large excess of air.

All the unsuccessfully treated articles were red with sesquioxide outside; but there was, nevertheless, a coating of magnetic

iron and air to their own devices, the retort, of course, being tightly closed. During each half hour a coating of magnetic oxide was formed, and the operation was repeated as often as was considered necessary. Effective as this was for cast iron, the cost of producing the coating was as great as by the Barff process, for both of them required that the chamber should be heated externally, and this, with large furnaces, is very expensive. Another plan that I adopted was to first find out approximately the extent of the surface of the goods to be treated,

articles to excess during a fixed period of generally 40 minutes, when magnetic oxide was formed close to the iron and sesquioxide over all. Then for 20 minutes I closed the air inlet entirely, leaving the gas-valve open, and so reduced the outside coating of sesquioxide to magnetic oxide by the reducing action of the combustible gases alone.

* Read at the annual meeting of the American Institute of Mining Engineers, February 21st, 1882.

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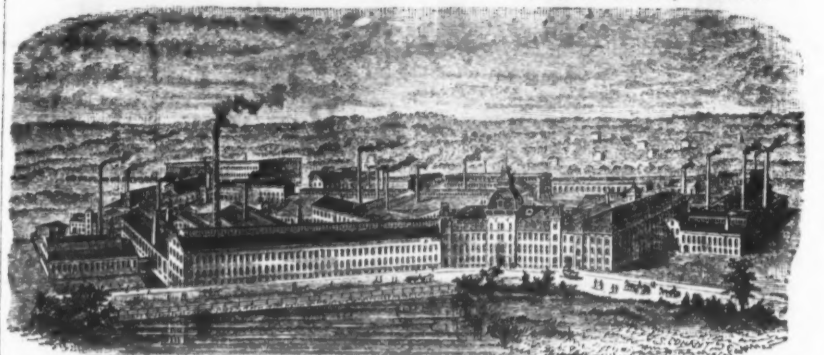
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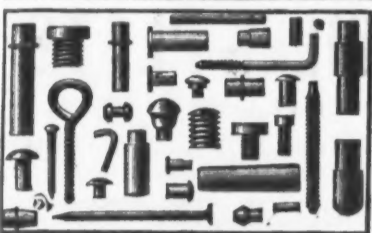
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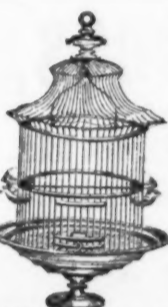


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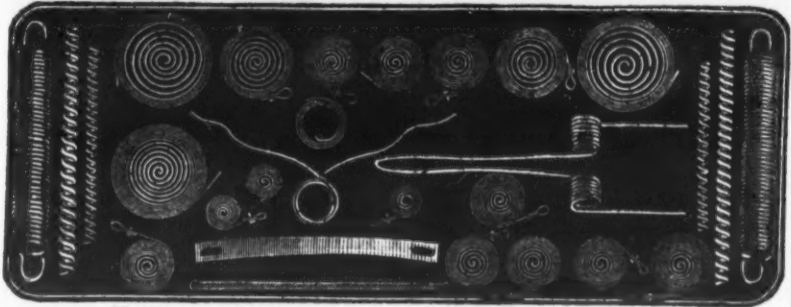
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(3) 4 (Fe, O₂) + Fe = 3 (Fe, O₂).

When deoxidizing by combustible gases,
consisting mainly of carbonic oxide, three
equivalents of sesquioxide unite with one of
carbonic oxide and form two equivalents of
magnetic oxide and one of carbonic acid,
and, symbolically, (4) 3 (Fe, O₂) + CO =
2 (Fe, O₂) + CO₂. Another method of reduction
is by carbon itself, when the formula
stands thus: (5) 3 (Fe, O₂) + C = 2 (Fe, O₂)
+ CO.

Formula (4) is also the reaction when
rusty iron is reduced by producer gases, and
which consist largely of carbonic oxide, and
by the specimens exhibited it will be seen
that articles completely pitted with rust may
have their surfaces rendered rustless. In
this case the periods of oxidizing and deoxidizing
are reversed—that is to say, the latter
occupies 40 and the former 20 minutes. No
oxidizing is theoretically necessary, but
practically a certain amount is requisite to
keep up the heat in the chamber, which, of
course, could not be done unless combustion
took place some time or other. I only mention
the reduction by carbon as exemplified by
Formula No. 5 because, while experimenting
with a furnace, I was asked by the
proprietors of a valuable red-oxide deposit,
which was found in so finely divided a state
as to be capable of being used at once as a
paint, whether I could reduce it to a magnetic
oxide. I tried to do so by carbonic
oxide, but I found that only the surface of
it was affected, and that even this, when
taken out of the furnace, speedily returned
to its original red color by the combined
actions of the hot unconverted material
underneath and the air above. It will be
found from formula (5) that 2½ pounds
of carbon are required to reduce 100
pounds of red oxide. This I mixed intimately,
in the shape of powder, with the
red oxide, brought the mixture to a
red heat and the result was black
magnetic oxide. Not only this, but by
adding more carbon I could make the color
lighter and lighter until it was almost
identical with the coating produced in my
previous experiments with carbonic acid, and by
reducing the quantity of carbon below 2½ per
cent various shades of purple were obtained,
the red appearing more and more prominent
as the quantity of carbon was diminished.
It will be as well, before I make any
comparison between Professor Barff's process
and those patented by my father and myself,
to state that the whole of the Professor's
patents, wherever existing, have been
purchased by my father, so that in this case at
least I hope you will not say that 'comparisons
are odious.' Professor Barff's process
is better than ours for wrought iron, and
perhaps for polished work of all kinds, as
iron commences to decompose steam at a
very low temperature; in fact, much below
visible redness. Only the other day, at the
annual meeting of the Association of American
Stove Manufacturers, held in New York,
I was asked whether stove patterns might
not be made of cast iron, polished and then
oxidized? Here is one among many instances
where the steam process is almost
invaluable. For ordinary cast iron, and
especially that quality which contains much
carbon, the Barff process is much too slow in
its action, and some specimens that I have
treated in England have taken as much as
36 hours to coat effectually, which could
readily have been finished off in five hours
by the Bower process.

The main distinction between the two
is that the Bower is much more energetic
in its action than the Barff process. The
carbon in cast iron impedes oxidation, and
so, while cast is far more readily treated
in the Bower furnace, wrought iron is apt
to scale unless it is rusted beforehand. The
rust then eats into the metallic surface
under the influence of heat, and forms a
tenacious combination with it. The ob-
jection to the use of a closed muffle ex-
ternally heated in the Barff process has been
almost entirely overcome by simply putting
wrought iron into a Bower furnace, pre-
viously well heated, then shutting off both
the gas and air supplies, and admitting
steam into the regenerator tubes. The steam
thus passes through the red-hot tubes,
then through the combination chamber and
its contingent passages, already highly
heated, over the articles in the oxidizing
chamber, heating and oxidizing them, and
thence over the outside of the regenerator
tubes, depositing a great portion of its heat
there before passing to the chimney, and
which is again picked up by the incoming
fresh, cool steam. In this way the heat in
the chamber is highest shortly after the com-
mencement of the operation, and gets gradu-
ally lower during the time of exposure,
which varies, according to the class of goods,
from five to ten hours. At the close of the
operation, just before the articles are taken
out, everything is moderately cool, and this
for steam is the perfection of action, as
stated by Professor Barff himself. Steel, I
consider, can be equally well treated by both
processes, and, indeed, it is natural to expect
this, steel being, so far as the quantity of carbon
it contains is concerned, between cast
and wrought iron. Polished steel, however,
is better treated in a low-temperature Barff
furnace.

With regard to the quality of fuel burned
in the gas producers, a non-cooking gas coal
is the best, and Virginian splint has suited
very well in this country, and of this about
1 ton every three days is required for a fur-
nace with an oxidizing chamber 13 feet long,
4 feet 3 inches wide and 4 feet 3 inches high.
When a gas coal is employed, it should be
fed through the charging hoppers just before
each deoxidizing operation, when a smoky
flame is of great advantage. I have, how-
ever, discovered that anthracite can be used
as well as a gas coal, by simply allowing
petroleum to drop at the rate of 1 gallon per
hour upon the red-hot surface of the coal in
one of the gas producers. This method has
been exclusively used in the coating of the
articles exhibited in this room at the works
of Messrs. Poulson & Eger, architectural
engineers, at North Eleventh and Third
streets, Brooklyn, E. D., N. Y., to whom I
am much indebted, not only for these beau-
tiful castings, but for the constant courtesy
and energy they have always exhibited dur-
ing the erection of their furnaces. At pres-

ent they have two erected, one a Bower
furnace of the size before mentioned, and
the other a small Barff furnace for the treat-
ment of very delicate or polished articles.
These magnetic-oxide processes not only
protect from rust, but the coating is of such
a beautiful color as to render articles ready
for the market as soon as they are out of the
furnace and cooled. One remarkable fea-
ture of them is that there is no more cost
(except in the labor of handling them) in
treating 2240 articles, each weighing a pound,
than there is in coating a cube of metal
weighing a ton; and so penetrating is the
process that, no matter how intricate the
pattern may be, every crevice—which it
would be almost impossible to get at with a
paint brush—is as effectively coated as the
plainest surfaces, as will be observed by ex-
amining the specimens exhibited in this
room. For art purposes the French gray
color, with shades approaching to black,
might not always be suitable; but if it
should be necessary to use paint on the iron
so coated, there is the absolute certainty that
it will remain on in the same way as it does
on wood or stone, and thus iron may be used
for constructive work in a thousand direc-
tions in which it has not up to the present
time been possible, on account of its liability
to rust, no matter what the coating used to
protect it has been.

I can give an instructive instance of
this. A company in Paris had expended a
very large sum over Dode's inoxidizing
process, which process consists in the depos-
iting of a layer of borate of lead on iron or
steel, and then gilding, platinizing or bronzing
them, and certainly the articles so
treated were exceeding beautiful to look at;
but the iron ultimately rebelled and threw
off the coating, so that the shareholders
were in a fair way of losing all their capital,
when it was suggested to the directors that
if their compositions could be deposited
direct upon magnetic oxide they would con-
quer the difficulty. They then applied to
my father for specimens of coated iron to
experiment upon, and they were so satisfied
with the result that the company purchased
all our European patents except England's,
and are carrying on the combined processes
on a large scale. They have, besides their
furnaces for the Dode process, four large
Bower ones, two being 36 feet long by about
6 feet 6 inches wide and 6 feet high, and a
Bower-Barff furnace, also of large size.
Others, however, are in course of erection.

Engineers and manufacturers appear far
more ready to apply the processes here and
on the Continent of Europe than up to the
present time they have been in England;
but perhaps the reason has been that, so far
as Professor Barff's process is concerned, it
has only just been shown how large masses
can be dealt with—namely, by the use of the
Bower furnace—and I can show that for the
treatment of underground pipes, wrought-
iron sleepers, roofing and the like, the pro-
cess can be readily applied, and at a cost
much less than that of galvanizing, and it
will at the same time be infinitely more
durable; while for ornamental cast and
wrought iron it is scarcely possible to imagine
anything more artistic in color than some of
the articles after they have been treated.
For ordinary hollow-ware for kitchen use,
whether of cast or wrought iron, this process
is admirably adapted, and though I have been
told that the gray or black color will prob-
ably be objectionable, yet I imagine, if it can
be shown, as we can do, that the magnetic
oxide is more durable, more easily cleaned
and much cheaper than even the common
tinted article, a market will soon be created.
Anyhow, the new combined processes are
so far developed and they have been so
thoroughly examined by scientific and prac-
tical men both here and in Europe (whose
testimony to the value and efficacy of them
is voluminous), that they have passed from
the region of theoretical investigation into
that of practical application, and means
have been taken for establishing works in
different centers in Europe, as will also be
done here, for the purpose of coating iron
and steel as a trade operation. One firm
alone in Scotland, Messrs. Walter Macfar-
lane & Co., have adopted the process, their
output of ornamental castings per day ex-
ceeding 100 tons! It is intended to apply
the process to cast-iron gas and water pipes,
and as the former have comparatively no
pressure to bear, they may be made much
lighter than they now are, if rendered incor-
rodible; while for water, it will be a great
advantage to have both the main and service
pipes rendered safe from rust, which not
only discolors the water, but forms the
nucleus of very troublesome deposits. There
is no reason now why wrought-iron or mild-
steel pipes should not be used for the same
purposes, especially for the interior towns of
distant countries, where the first cost of the
pipes is but small as compared with the cost
of carriage.

My father has himself used gas and
water pipes where the cost on arrival at
their destination has been five times greater
than their first cost in England. If, then,
light wrought-iron or steel pipes could be
used, not weighing one-third of those made
of cast iron, and rendered practically inde-
structible, what an enormous saving will be
effected! Again, in the case of railway
sleepers in iron and steel, which are now
almost wholly used in Germany, the process
is likely to prove of much advantage, so at
least I am told by engineers, both in Belgium
and in Germany; and if there why not here?
For fountains, railings and all architectural
work the process is invaluable, and iron
may now be used in many instances instead
of bronze. It will naturally be asked, what
is the cost of the process? I cannot do bet-
ter than answer the question by quoting
from the report of Professor Flamache, the
engineer-in-chief of the State railways in
Belgium, who was sent over specially to
England to report on the process by the Pub-
lic Works Department of that country. His
estimate of cost, after a very careful exami-
nation and testing of the process, was 7½
francs per 1000 kg., or nearly \$2 per ton, at,
of course, the Belgian rate of expenses. He
also gives the cost of coating a certain ex-
tent of surface, but this I consider to be
completely valueless, as, for example, I have
had a furnace full of 50-pound weights and
another time I have had full of gas-gov-
ernor tops, the surface in the latter case
being perhaps one hundred times more in

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extent than in the former, while the actual cost of oxidizing would be the same in both cases. He also says that this cost may be reduced, as instead of one workman attending to one furnace, he can attend to three or four; also by a better system of taking the articles out than existed in the experimental furnace that he saw. Sir Joseph Whitworth, feeling much interest in Professor Barff's process, sent to him some steel to be oxidized, so that he might ascertain whether it did or did not lose in strength by the operation, and the result of Sir Joseph's testing was that there had been no alteration whatever. Theoretically, one would expect that iron and steel would be somewhat toughened, as the tendency of the process is to anneal, and would, no doubt, if continued long enough, render some classes of cast iron malleable. A very thin article, if excessively coated, might probably be weakened, due to the fact that the coat of magnetic oxide would form an appreciable percentage of the bulk of the article; but this, of course, is a very extreme case, and one which is not likely ever to occur in practice.

The development of these processes has been a long and tedious business, and one requiring much faith and patience in the midst of most disheartening failures for months together; but to gentlemen connected with the iron and steel industries, and who know well that results are only obtained by patient and well-directed toil, I need not dwell on this, as almost every man who has had to reduce theory to practice has had abundant experience of the same kind.

We annex to Mr. Bower's paper a description of the Bower furnace, illustrated by the accompanying cuts, both of which, description and cuts, were furnished by Mr. George W. Maynard, president of the Bower-Barff Rustless Iron Co., of 24 Cliff street, New York:

"The furnace is so constructed that, the carbonic oxide from the generator being caused to meet with a current of hot air, combustion takes place, which is perfected before the products therefrom are admitted to the chamber containing the articles to be coated, and the waste of products of combustion are caused to pass on their way to the chimney over and among a series of pipes, through which the cold air required for combustion is admitted, so as to become heated and prepared for admixture with the carbonic oxide. Continuous regeneration, therefore, takes place, and the operations are effectively performed under the most economical conditions. In the following description the same letters of reference indicate corresponding parts in all the figures: "Fig. 1 represents a longitudinal section of the furnace, taken along the line 1-2 in Figs. 2, 3, 4 and 6. Figs. 2 and 5 are transverse vertical sections of the same, taken respectively along the lines 3-4 and 5-6. Fig. 3; and Figs. 3, 4 and 6 are horizontal sections taken respectively along the lines 7-8, 9-10 and 11-12. Figs. 1, 2 and 5. *a a a* are the producers for gasifying the fuel which is supplied through hoppers *b b b*. The carbonic oxide from the combustion of the fuel in the producers *a a a* passes along a conduit, *d* (its flow being controlled by a slide, *c*), to the openings *e*, where this combustible gas meets a current of hot air ascending through a passage, *f*, and is consumed. The products of combustion are thence conducted along a passage, *g*, where they are thoroughly mixed by open brick-work cross walls, *h*, and then return along a passage, *i*, whence they enter, through the oblong holes *l*, the chamber *k*, in which the articles to be coated are arranged. After having passed over and among the articles to be coated, the waste escapes downward through ports *m*, into regenerator chambers *p*, and thence to the chimney flue *S*, heating in its passage the tubes *t* composing the regenerator, and which are securely supported by the cross walls *W*. Cold air enters the apparatus at *r*, through a channel provided with a regulating valve under the control of the furnace tender. This air then passes along the lower rows of regenerator tubes and back through the upper tubes, thus becoming highly heated by the waste gases, and capable of developing greater heat when burned with the combustible gas."

British Exports of Iron and Steel.

Accepting the figures given in several of our English exchanges relating to exports of iron and steel from Great Britain to other countries, it appears that for the month of January they showed an almost inappreciable difference, as compared with those of the preceding month, the figures being 289,802 and 288,052 gross tons respectively. During the corresponding period of the year 1882, however, the exports amounted to 317,390 tons, thus showing a decrease for January, 1883, of 27,588 tons. At the same time, the demand from the United States during that month was much smaller than during the preceding month and the month of January, 1882, this being readily apparent from the following table:

Articles.	Gross tons.		
	January, 1883.	Dec'r, 1882.	January, 1882.
Pig iron	31,450	20,350	21,025
Old iron	9,643	10,325	3,215
Steel, unwrought	13,410	4,711	2,117
Tin plates	49,594	12,456	25,174
Cast or wrought	345	437	222
Hoops and sheets	3,743	1,419	1,115
Bar, angle, &c.	26,009	8,500	1,119
Iron and steel rails	27,523	7,222	6,000
Total	150,557	70,948	55,958

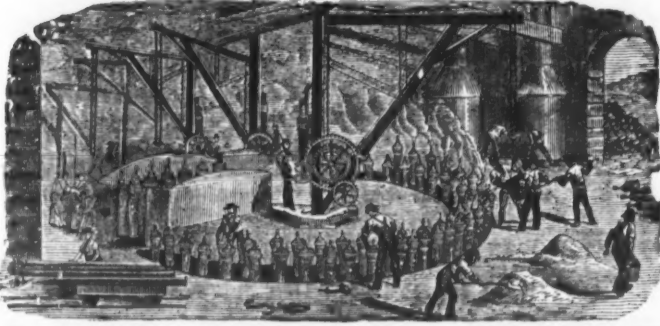
It will be seen that, as compared with January, 1882, there was a falling off last month in everything, and as compared with December, 1882, there was a falling off in everything but cast and wrought iron, tin plates and hoops and sheets. The figures for last January are lower than those for any month since January, 1881, when only 47,551 tons of iron and steel were exported from Great Britain to the United States.

During the year 1882, 381.86 miles of railroad track were laid in Illinois, 544.80 in Indiana, 278.55 in Michigan, 371.33 in Wisconsin, and 500.93 in Ohio, making a total of 2,077.52 miles in five of the Western States.

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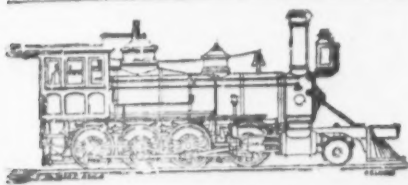
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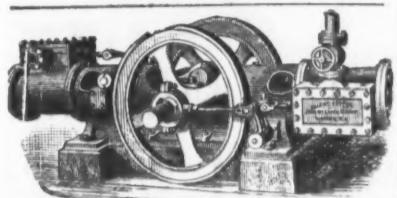
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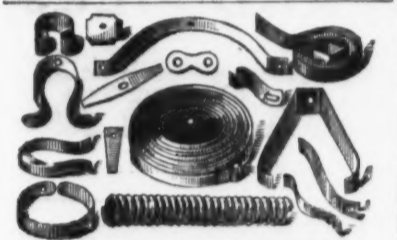
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and invention; and we caution the trade and customers against purchasing this article when not made
by ourselves, as we intend to protect our rights under our patent.

**WE ARE THE ORIGINAL AND FIRST INVENTORS OF THIS STYLE
OF PUMP, AND HOLD VALID LETTERS PATENT ON SAME, AND ANY
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MANUFACTURE OF SAME IS OF COURSE ABSURD AND WITHOUT THE
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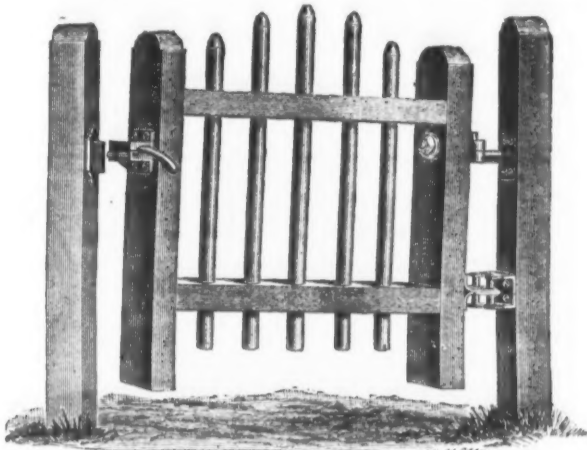
Improved Gate Trimmings.

Mr. John L. Reed, of Canajoharie, N. Y.,
has recently perfected an improvement in
gate latches and hinges, the general features
of which are clearly shown in Figs. 1 to 4
of the engravings. The gate latch is of the
variety known as a gravity latch, and is so
arranged as to be applied to a gate that

representations of Kraim justified the attach-
ment, and its dissolution and allowance of
damages for its issuance were erroneous."

COLLATERAL SECURITIES—DEBT NOT PAID.

A bank lent \$13,000, and the stock of a
corporation was deposited with it as col-
lateral security for the loan. On the failure
to pay the debt the notes for it were sur-



—Fig. 1.—Improved Gate Trimmings, Manufactured by John L. Reed,
Canajoharie, N. Y.

swings in either direction. Fig. 1 shows a
gate with the trimmings we are describing
fully applied, while Fig. 2 shows the latch
itself. There are two independently operat-
ing catches, each provided with a crooked
weighted handle that serves the double pur-
pose of releasing the latch when the gate is
to be opened, and by its weight of throwing it
forward to hold the gate shut. In using a
gate provided with this attachment, the
weighted lever facing the person who desires
to pass through is raised and the gate pushed

rendered, and proper notice was given to
the debtor that the security would be sold.
At the sale, which was a public one, the
creditor bought the stock and took a new
certificate for it. The debtor then brought
a suit in equity against the corporation and
the creditor to have the shares, declared to
be his property, on the ground that the sale
of the stock to his creditor did carry title to
the creditor. In this case—Canfield vs. the
Minneapolis Agricultural and Mechanical
Association—the United States Circuit Court,

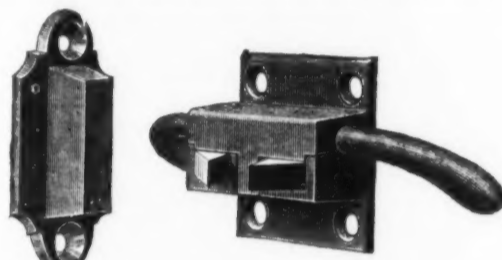


Fig. 2.—View of Latch and Stop.

from him. The arrangement of the hinges
is such that the gate swings back and is held
by the two latches shown in Fig. 2 engag-
ing with the catch provided for the purpose.
Fig. 3 shows the upper hinge, which, as
will be seen, by means of the screw-plate
that fastens to the post is adjustable in such
a manner as to give the gate any rise on
opening that may be desired. Fig. 4 shows
the construction of the lower hinge which is
used with a latch of this kind. The special

District of Minnesota, decided in favor of
the debtor. Judge Nelson, in the opinion,
said: "Though the apparent ownership of
the notes was in a third person, and the sale
of the stock conducted in his name, the evi-
dence shows clearly that the bank was the
real owner and purchaser, and it could not
acquire any title to the stock by the purchase.
The holder of collateral security is the trustee
of the owner, and at the sale of it he is
disqualified to become its purchaser; the



Fig. 3.—The Upper Hinge.

advantages pertaining to these fixtures, as
set forth by the manufacturer, are that no
springs are employed; that all the parts are
of cast iron and are of a character not liable
to get out of order, and that the parts are of
such a shape that a gate may be opened
when the person desiring to pass is unable to
use his hands, as in carrying something.
The weighted lever can be moved very
readily by touching it with the elbow. The
construction is such that the gate may settle

right to buy is in direct conflict with his
duty to so conduct the sale that the best
price shall be realized for the pledge."

SUBSCRIPTION TO STOCK—CONDITION.

A suit was brought to recover from a sub-
scriber to the stock of a corporation the
assessments thereon. On the trial of the
action—McClelland vs. Whiteley—in the
United States Circuit Court, Eastern District
of Wisconsin, it appeared that the defendant,

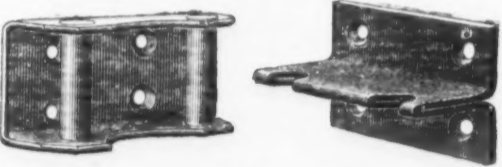


Fig. 4.—The Lower Hinge.

without disarranging the fastenings. The
spaces between the gate and posts are the
same for the hinges and latch, thus giving a
good appearance to a gate fitted with them.
The hinges shown in the engravings are
made of wrought iron.

LATEST LEGAL DECISIONS.

ATTACHMENT—DEBTOR THREATENING TO DIS-
POSE OF HIS PROPERTY.

An attachment was procured against a
debtor on the ground that he had made
threats that he would dispose of his property
to protect himself if he was sued by the
plaintiffs: he said he had things fixed—all
cut and dried. The lower court dissolved
the attachment on the hearing, and an
appeal was taken in the case—Newman vs.
Kraim—to the Supreme Court of Louisiana,
which reversed the judgment. Judge Fen-
ner, in the opinion, said: "It is said that
the intention declared by Kraim was only a
conditional one—dependent on suit being
brought by plaintiffs. True, but this con-
dition being dependent on the will of plain-
tiff, in the exercise of an unquestioned right,
that condition being accomplished by the
determination to sue, the declared intention
to dispose of the property fraudulently be-
came thereby actual and positive. The rep-

when solicited to subscribe by the president
of the company, declined, but said that in a
certain contingency he would subscribe. At
the request of the president he put his name
down in a private memorandum-book of the
president for 20 shares, and subsequently
gave him, at his request, a proxy to vote the
stock at a meeting of the stockholders, which
was used. The defendant showed that the
contingency never happened, and claimed
that the proxy and its use did not operate as
a ratification of his subscription. Judge
Dyer, in giving judgment for the defendant,
said: "The proxy, it appears, was sent
only in anticipation of a future subscription—
that is, that the stock was to be taken on a
certain event happening, and which did not
happen. The defendant did not know that
the president had placed his name on the
subscription book of the company, and
therefore was not bound by his action. As
to the ratification, it is well settled that the
ratification of the act of an agent previously
unauthorized must, to bind the principal, be
made with a full knowledge of all the material
facts."

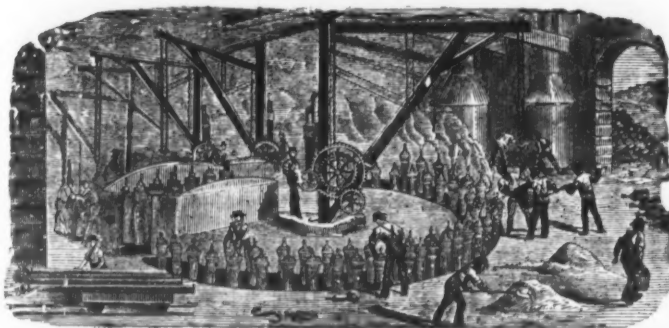
LIABILITY OF STOCKHOLDERS.

A creditor of a corporation, having ob-
tained a judgment against it which was
worthless, brought a suit to equity against
certain stockholders to compel them to pay
the unpaid assessments on their shares, by

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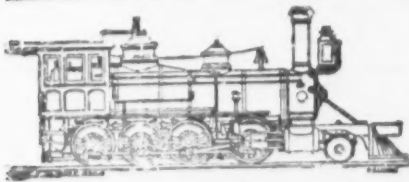
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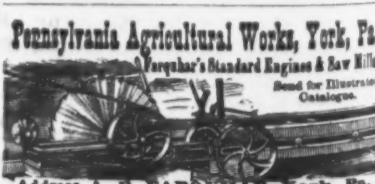
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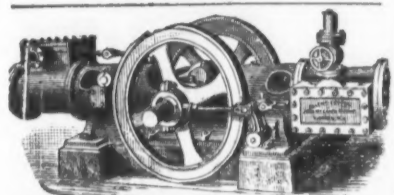
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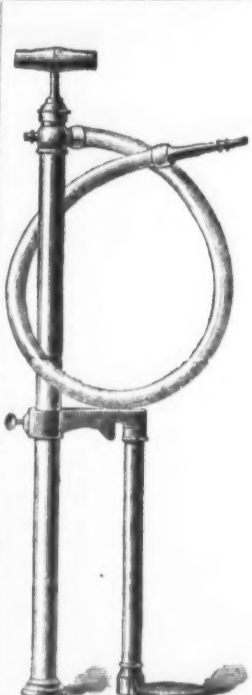
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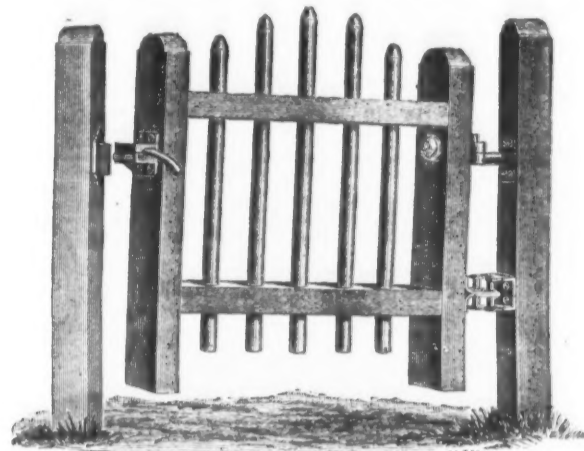
Improved Gate Trimmings.

Mr. John L. Reed, of Canajoharie, N. Y.,
has recently perfected an improvement in
gate latches and hinges, the general features
of which are clearly shown in Figs. 1 to 4
of the engravings. The gate latch is of the
variety known as a gravity latch, and is so
arranged as to be applied to a gate that

representations of Kram justified the attach-
ment, and its dissolution and allowance of
damages for its issuance were erroneous.

COLLATERAL SECURITIES—DEBT NOT PAID.

A bank lent \$13,000, and the stock of a
corporation was deposited with it as col-
lateral security for the loan. On the failure
to pay the debt the notes for it were sur-



—Fig. 1.—Improved Gate Trimmings, Manufactured by John L. Reed,
Canajoharie, N. Y.

swings in either direction. Fig. 1 shows a
gate with the trimmings we are describing
fully applied, while Fig. 2 shows the latch
itself. There are two independently operat-
ing catches, each provided with a crooked
weighted handle that serves the double pur-
pose of releasing the latch when the gate is
to be opened, and by its weight of throwing it
forward to hold the gate shut. In using a
gate provided with this attachment, the
weighted lever facing the person who desires
to pass through is raised and the gate pushed

rendered, and proper notice was given to
the debtor that the security would be sold.
At the sale, which was a public one, the
creditor bought the stock and took a new
certificate for it. The debtor then brought
a suit in equity against the corporation and
the creditor to have the shares declared to
be his property, on the ground that the sale
of the stock to his creditor did carry title to
the creditor. In this case—Canfield vs. the
Minneapolis Agricultural and Mechanical
Association—the United States Circuit Court,

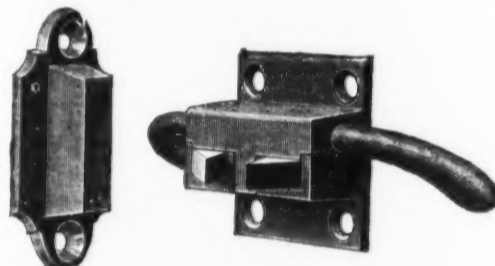


Fig. 2.—View of Latch and Stop.

from him. The arrangement of the hinges
is such that the gate swings back and is held
by the two latches shown in Fig. 2 engag-
ing with the catch provided for the purpose.
Fig. 3 shows the upper hinge, which, as
will be seen, by means of the screw-plate
that fastens to the post is adjustable in such
a manner as to give the gate any rise on
opening that may be desired. Fig. 4 shows
the construction of the lower hinge which is
used with a latch of this kind. The special

District of Minnesota, decided in favor of
the debtor. Judge Nelson, in the opinion,
said: "Though the apparent ownership of
the notes was in a third person, and the sale
of the stock conducted in his name, the evi-
dence shows clearly that the bank was the
real owner and purchaser, and it could not
acquire any title to the stock by the purchase.
The holder of collateral security is the trust-
ee of the owner, and at the sale of it he is
disqualified to become its purchaser; the



Fig. 3.—The Upper Hinge.

advantages pertaining to these fixtures, as
set forth by the manufacturer, are that no
springs are employed; that all the parts are
of cast iron and are of a character not liable
to get out of order, and that the parts are of
such a shape that a gate may be opened
when the person desiring to pass is unable to
use his hands, as in carrying something.
The weighted lever can be moved very
readily by touching it with the elbow. The
construction is such that the gate may settle

right to buy is in direct conflict with his
duty to so conduct the sale that the best
price shall be realized for the pledge."

SUBSCRIPTION TO STOCK—CONDITION.

A suit was brought to recover from a sub-
scriber to the stock of a corporation the
assessments thereon. On the trial of the
action—McClelland vs. Whiteley—in the
United States Circuit Court, Eastern District
of Wisconsin, it appeared that the defendant,

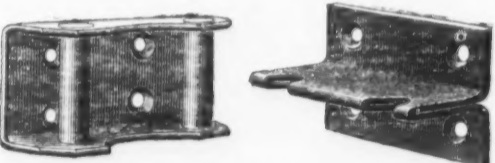


Fig. 4.—The Lower Hinge.

without disarranging the fastenings. The
spaces between the gate and posts are the
same for the hinges and latch, thus giving a
good appearance to a gate fitted with them.
The hinges shown in the engravings are
made of wrought iron.

LATEST LEGAL DECISIONS.

ATTACHMENT—DEBTOR THREATENING TO DIS- POSE OF HIS PROPERTY.

An attachment was procured against a
debtor on the ground that he had made
threats that he would dispose of his property
to protect himself if he was sued by the
plaintiffs; he said he had things fixed—all
cut and dried. The lower court dissolved
the attachment on the hearing, and an
appeal was taken in the case—Newman vs.
Kram—to the Supreme Court of Louisiana,
which reversed the judgment. Judge Fen-
ner, in the opinion, said: "It is said that
the intention declared by Kram was only a
conditional one—dependent on suit being
brought by plaintiffs. True, but this con-
dition being dependent on the will of plain-
tiffs, in the exercise of an unquestioned right,
that condition being accomplished by the
determination to sue, the declared intention
to dispose of the property fraudulently be-
came thereby actual and positive. The rep-

when solicited to subscribe by the president
of the company, declined, but said that in a
certain contingency he would subscribe. At
the request of the president he put his name
down in a private memorandum-book of
the president for 20 shares, and subsequently
gave him, at his request, a proxy to vote the
stock at a meeting of the stockholders, which
was used. The defendant showed that the
contingency never happened, and claimed
that the proxy and its use did not operate as
a ratification of his subscription. Judge
Dyer, in giving judgment for the defendant,
said: "The proxy, it appears, was sent
only in anticipation of a future subscription—
that is, that the stock was to be taken on a
certain event happening, and which did not
happen. The defendant did not know that
the president had placed his name on the
subscription book of the company, and
therefore was not bound by his action. As
to the ratification, it is well settled that the
ratification of the act of an agent previously
unauthorized must, to bind the principal, be
made with a full knowledge of all the mate-
rial facts."

LIABILITY OF STOCKHOLDERS.

A creditor of a corporation, having ob-
tained a judgment against it which was
worthless, brought a suit in equity against
certain stockholders to compel them to pay
the unpaid assessments on their shares, as

MAST, FOOS & CO.
Springfield, O.
NEW STYLE
BUCKEYE
FORCE
PUMP.

Works easy, throws a constant stream.
Has Porcelain Lined and Brass Cylinders.
Is easily set. Is the Cheapest and Best Force Pump in the world for Deep or Shallow Wells.
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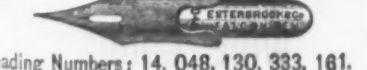
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4, 5 and 6 fingers.
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4, 5 and 6 fingers.
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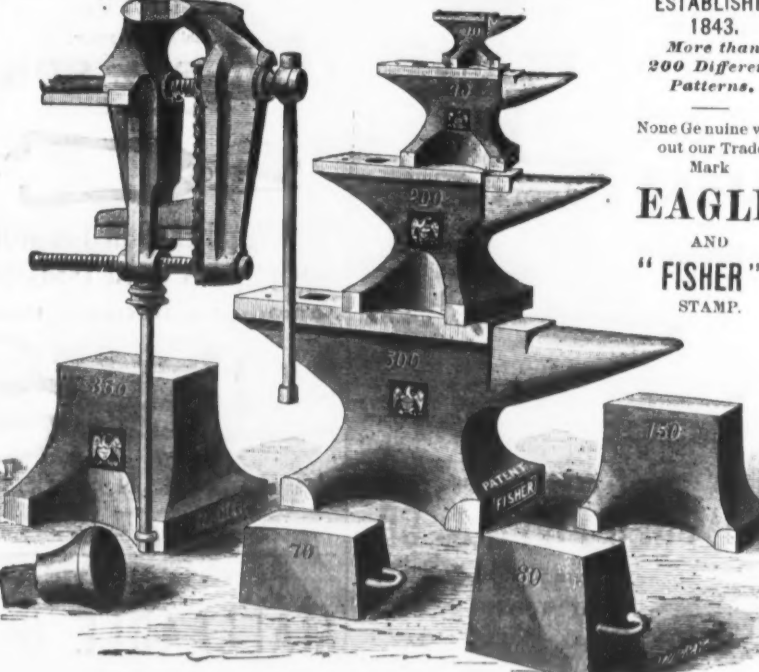


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Maker and Patentee of the improved
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Communications by letter will receive prompt attention.
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ROUND, SQUARE AND OBLONG, IN ALL SIZES.
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Send for List and Discount.
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Insulated on the bare wire with H. Spiltdorf's patented Liquid Insulation, covered with cotton or silk.
All sizes of Bare and Covered Wire in Stock.
The conductivity of every bundle tested and warranted.

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Are drawn from the Best Norway Iron Rods only. They are hot forged and cold-pointed, rendering them both tough and stiff, and are warranted
FIRST-CLASS IN EVERY RESPECT.

By the use of improved machines we forge Fifty per cent. More Nails on a machine than any other company, and are thus enabled to sell them proportionately less than any other nail of equal quality. All nails branded ESSEX fully guaranteed.

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Manufacturers of Bailey's Patent Adjustable Planes.
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FOUNDRIES, ATTENTION!

FOR THE
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SEND FOR DESCRIPTIVE CIRCULAR TO
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LOCKWOOD MFG. CO.,

SO. NORWALK, CONN., MANUFACTURERS OF
KNOB & DEAD LOCKS, RIM & MORTISE LATCHES,
Fine Gray Iron Castings, Iron Toys, Metal Patterns &c.

that his judgment should be satisfied. In this case—Harmon vs. Page—the Supreme Court of California decided in favor of the creditor. The Chief Justice (Morrison), in the opinion, said: "It is too late, after the investment is found unprofitable and debts incurred, for stockholders to withdraw their subscriptions. They being in general free from personal responsibility, the capital stock constitutes the sole fund to which the creditors look for a liquidation of their demands. It is the basis of the credit which is extended to the corporation by the public, and a substitute for the individual liability which exists in other cases. So far as the creditors are concerned, it is regarded in law as a trust fund, pledged for the payment of the debts of the corporation. If, therefore, by the willful or stubborn inaction of the directors or stockholders the company fail to meet their obligations or perform their duties, a court of equity will afford the requisite relief."

STOCK LOANED—BORROWER USING IT AS COLLATERAL SECURITY—RIGHTS OF CREDITOR.

A, an owner of shares in a corporation, lent the certificates for it to B, signing the power of attorney on the back of the certificates in blank. This power contained the usual authority to sell and transfer the stock. B used this stock as security for a loan from C, giving him the certificates, with the powers of attorney, as he had received them from the owner. The loan to B was not paid, and after the death of A his administrator filed a bill in equity to have the stock in C's hands declared the property of A, and to compel the delivery of the certificates. The court below decided in favor of C, and the case—Otis vs. Gardner—was appealed to the Supreme Court of Illinois, which also decided in C's favor. The Chief Justice (Scott), in the opinion, said: "The rightful possession of the certificates, with the blank endorsements and powers of attorney thereon, would give the holder authority to fill up the blanks and have the stock transferred to him on the books of the corporation. Had that been done it would have passed the legal title to the assignee; and equity will certainly give the assignor no relief against the sale or pledge of the stock in good faith, although the assignee may never choose to have the stock transferred to him under the by-laws of the corporation."

INDUSTRIAL ITEMS.

NEW YORK.

At the annual meeting of the New York Wire and Wire Rope Co., held last month at their offices 21 and 22 Astor House, the following trustees and officers were elected: J. N. H. Patrick, of Omaha, president; A. B. Parker, of New York, vice-president and general manager; C. G. Hildreth, of New York, secretary; Thomas McElrath, of New York, treasurer, and A. B. Byers, of Pittsburgh. The change in the management, whereby R. J. Anderson, formerly president of the company, and James A. Van Brunt, formerly secretary and treasurer, were omitted from the present board, was brought about by the purchase of the controlling interest of the stock by the present officers, from the Merchants' and Manufacturers' Bank, of Pittsburgh, which latter held the stock formerly owned by Mr. R. J. Anderson. The company have several months' orders ahead, and their facilities for the manufacture of all kinds of wire and wire rope are such as to give fair promise of success.

PENNSYLVANIA.

The Custer Beam Works, which were established in 1838, have removed to 2045 North Seventh Street, Philadelphia. Mr. Stevens has retired, and the business will in future be carried on by Mr. Wm. N. Famous.

Oliphant Furnace, owned by the Fayette Coke and Furnace Co., will soon be ready for work. Extensive repairs have been made during the stop and several needed improvements added.

A. O. Tinstman, the coke manufacturer, has consummated the sale of 1000 acres of valuable coal land lying between Latrobe and Mt. Pleasant to Wm. Thaw. The property underlies about a dozen farms, and is about the last large block of land that can be bought in that section at purchasable figures. Thaw states that the purchase was a private transaction, and denounces as without foundation the rumor that the land was bought in the interest of the Pennsylvania Co. or any one else. The price paid is said to be \$100 per acre. It is not probable that the land will be opened for development at once, but as it lies in the region in which the Baltimore and Ohio, the Vanderbilt and the Pennsylvania lines are biding for traffic, it will eventually become very valuable.

The Charlotte Furnace Co. have banked up their furnaces at Scotland for an indefinite period.

It is now stated that the rolling mill of the Etna Iron Works, at Newcastle, will be started up again as soon as necessary repairs have been made.

A. H. Gray and H. C. Crowell, of Erie, doing business under the firm name of the Taper Sleeve Pulley Works, commenced a proceeding in equity in the United States Circuit Court against the Taper Sleeve Pulley Works, of Dubuque, Iowa, operated by a corporation of which Edward Bindley, of Pittsburgh, is president. The bill relates that on December 16, 1876, the plaintiff purchased from O. B. Cook & Co. the machinery, stock and patents for the manufacture of the Taper Sleeve Pulley, by virtue of which they had the exclusive right to manufacture the same in all parts of the United States east of the Mississippi River. The defendants set up a manufacturing in Dubuque and adopted the same firm name. Circulars and price lists and bills were sent out by them under the title of the Taper Sleeve Pulley Works, by which means they diverted and received a large portion of the plaintiffs' trade, greatly to their detriment. The plaintiffs ask that the defendants be compelled to change their firm name and to destroy all papers bearing the name of the plaintiff company.

No. 3 stack of the North Lebanon Furnaces, at Lebanon, will blow out shortly for repairs.

The Keystone Rolling Mill, at Reading, which has been idle for the past two months, will start up soon.

The new foundry and stove works at Newcastle will probably get into operation by April.

Once more it is reported that Major A. B. De Saules has resigned his position as vice-president of the Dunbar Furnace Co., to take effect April 1st.

The tube works of J. M. Downing & Co., at Newcastle, stand upon leased ground, and the lease being about to expire, the citizens of Mercer have made offers to the firm with a view of having the works located in their town. Newcastle has as yet made no effort to retain the works.

Stack No. 1 of the Henry Clay Furnaces, at Reading, which has just been relined, met with an accident on March 7, part of the new lining falling in. The bricks are reported to have been very poor. The furnace is probably in blast again by this time.

Sheridan Furnace, near Reading, met with a similar accident last week. The cave-in was, however, of greater dimensions, and the work of repairs will occupy some weeks.

A new factory for the manufacture of barbed wire fence, nail rods, wire, &c., is to be erected this season at Beaver Falls. The articles of manufacture are to be made from Bessemer ingots made at the Edgar Thomson Steel Works. The capital stock of the concern will not be less than \$500,000, besides a number of valuable patents already in possession of some of the members of the company. Among the gentlemen interested are Andrew Carnegie and Henry Phipps, of the Edgar Thomson Steel Works; H. W. Hartman, formerly of the Gautier Wire Works, of Johnstown; J. L. Ellwood, wire-fence manufacturer, of New York; Mr. Stiles, of Chicago, and Mr. Sears, of Wisconsin. Twenty acres of ground have been purchased at Beaver Falls, whereon the works of the new concern will be erected.

PITTSBURGH AND VICINITY.

The articles of association of the "Anchor Transportation Company" have been filed for record in the County Recorder's office. The articles set forth that the corporation is formed for the purpose of building ships, vessels and boats, and the carriage or transportation of persons and property. The business of the said corporation is to be transacted in Stowe Township, Allegheny County. The larger proportion of the stock is divided between the Economite Society and Wm. A. Robinson, of Allegheny, the former holding 445 and the latter 365 of the 1000 shares. The capital stock is \$50,000.

It is stated that a company has been formed by employees of Chess, Cook & Co., for the purpose of starting a new tack factory.

VIRGINIA.

A corporation to be known as the Rorer Iron Co. has been organized at Roanoke, with Ferdinand Rorer, of Roanoke, president; Samuel Coit, of Hartford, Conn., vice-president; J. H. Sykes, of New York, treasurer; Lucian H. Coke, of Roanoke, secretary. Directors—G. M. Bartholemew, Samuel Coit, of Hartford, Conn.; George N. Gray, of Ironton, Ohio; E. G. McClannahan, G. Rorer, Roanoke. The Rorer Iron Co. own 3000 acres of land, most of which is rich in magnetic iron ore, situated in Cave Spring district, the western portion of Roanoke County, among which is the Joseph A. Gale property, on which a mining town known as Gale is being founded. Gale is about four miles from Roanoke. The company will build a narrow-gauge railroad at once from their mines at Gale, by way of Mr. G. W. Hawbert's farm, to intersect with the Shenandoah Valley Railroad in the west end of Roanoke. On the Roanoke River the company will erect, as early as practicable, a large furnace, which will be on the line of their narrow-gauge railroad.

OHIO.

The Ohio Falls Iron Works, New Albany, closed down for repairs December 30. They made 8204 tons finished iron during the year 1882, and sold during the same time 8204 tons. They have again resumed operations.

The Youngstown Steel Co. made a test of their new plant last week, which was eminently satisfactory in every respect, a fine quality of steel being produced. At present they employ but 30 men, but the force will soon be increased.

The Thomas Furnace, operated by the Arnold Furnace Co., with Mr. W. R. Drake as manager, is again in full operation. On the 20th of November last the top of the furnace fell in, making a stoppage of operation necessary. At that time the furnace was making only from 35 to 40 tons of iron per day. When repairs were commenced the proprietors conceived the idea of enlarging the furnace and thereby increasing its capacity. Consequently the work of rebuilding was commenced immediately. The stack of the furnace was raised 15 feet, making it now 70 feet high, with a bush 16 feet. The old water hoist was taken out, and a new steam hoist and safety cages put in; a new bell and hopper, much larger than the old one, have been placed on the top of the furnace; a new battery of boilers has been added, and another new set of boilers will be placed in position in a few weeks; a new smoke-stack 85 feet high has been built, and new steam, gas and air pipes added. The furnace now is in the best possible condition, and has a capacity of 75 tons of iron daily. The furnace manufactures the celebrated "Arnold" iron, which is a soft, strong all-ore foundry iron, combining all the peculiar properties of the best grades of Scotch foundry metal, as regard fluidity and softness, with nearly, if not quite, the strength of No. 1 Bessemer iron. These favorable results are attained by the use of the famous Mineral Ridge black-band ore and the celebrated Arnold magnetic ore from the Adirondack Mountains, New York. It exceeds any other iron now in the market for stove plate and light machine castings.—Niles Independent.

It is stated that W. D. Wood & Co., of Pittsburgh, are about to erect a new mill near the Wellsville Plate and Sheet Iron

Cutlery.

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NO ARTICLE MARKED "WILSON" IS GENUINE
UNLESS IT ALSO BEARS THE

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AND PROTECTED BY ACT OF PARLIAMENT.REGISTERED ALSO AT WASHINGTON, U.S.
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BUTCHERS' KNIVES,
BUTCHERS' STEELS,
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SHOE KNIVES.

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It having come to the knowledge of
JOHN WILSON that Counterfeit Butchers' Knives,
purporting to be of his manufacture, are being sold
in the United States, he hereby cautions all pur-
chasers of his Knives and Steels to be on the alert
against such impositions.JOHN WILSON also hereby gives NOTICE,
that it is his determination to institute Legal Pro-
ceedings against any person or persons who may be
detected infringing his Trade Mark, and with that
view he will handsomely reward anyone supplying
such evidence as will lead to the conviction of the
Makers and Vendors of the said Spurious Imitations.3 inch,.....\$11.50. 5 inch,.....\$15.00. 7 inch,.....\$20.00 Per Dozen.
DISCOUNT TO THE TRADE.DAME, STODDARD &
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Manufacturers, Importers and Dealers in

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SKATES AND
FANCY HARDWARE.

SPENCER & UNDERHILL,

94 Chambers Street, New York.

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Wood, Machine and Rail Screws, Stove and Tire Bolts, Rivets, &c.

Also O. AMES & SON'S Shovels, Spades and Scoops.

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A. Field & Sons' Tacks, Brads, Nails, &c.
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Germantown Tool Works' Warranted Hammers and
Hatchets (Stamped ties. Selsor & Co.).

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For heavy bedsteads, book-cases, flower
stands, refrigerators, safes, sideboards,
desks, or very heavy furniture. Also for
heavy ice chests, magazine boxes, stone
trucks, heavy showcases, beer boxes, or any
very heavy weight. Especially adapted for
use in beer bottling, fruit canning, tobacco
or warehouse establishments, where heavily
loaded tables need to be moved.

Send for Catalogue.

Our Drawings are so uniform, simple,
and complete, that they can be made
without competition from any other.

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CORPORATE MARK,



Joseph Rodgers & Sons'

(LIMITED)

CELEBRATED CUTLERY,

No. 22 Chambers Street, New York.

F. & W. CLATWORTHY, Agents.

The demand for Joseph Rodgers & Sons'
prowns having considerably increased, they
have, in order to meet it, greatly extended their
Manufacturing Premises and Steam power.To distinguish Articles of Joseph Rodgers
& Sons' Manufacture, please to see that they bear
their Corporate Mark.

ESTABLISHED 1836.

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93 Chambers and 75 Reade Streets,

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SOLE AGENTS FOR

Ely Bros., Caps, Wads, &c.,

Joseph Elliot & Sons, Razors,

Isaac Greaves, Sheep Shears, &c.,

Robert Sorby & Sons, Sheep Shears, &c.,

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&c. &c., &c.

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PARIS, 1855. PARIS, 1878.

MATTHIAS SPENCER & SONS,

Albion Steel Works, Sheffield,

MANUFACTURERS OF

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STEEL,

Table Knives, Razors, Shovels, &c., &c.,

of every description.

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Granted 1749.

A. F. BANNISTER & CO.

SUCCESSORS TO

FURNESS, BANNISTER & CO.,

MANUFACTURERS OF

TABLE CUTLERY,

Cor. Nassau & Sheffield Sts., NEWARK, N. J.

GEO. H. CREED,

SHIP CHANDLERY,

103 Reade Street, New York.

Manufacturers of and Wholesale Dealers in

Cotton and "Long Flax" Sail Duck,

Cotton and Linen Ravens,

Creed's Patent Ship's Clews, Helman's Wire Rope

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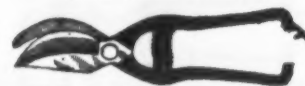
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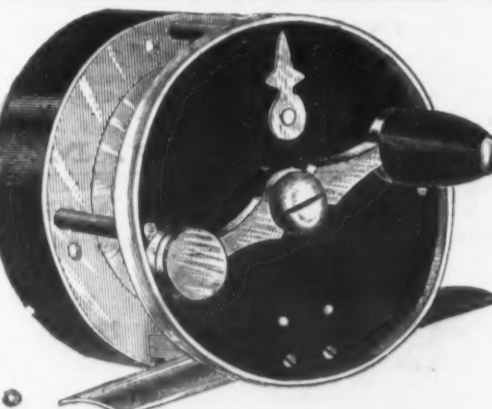
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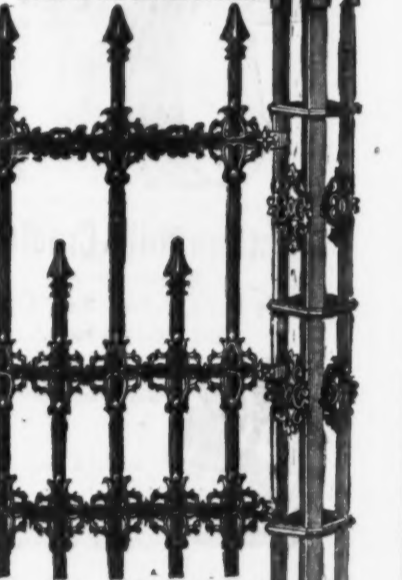
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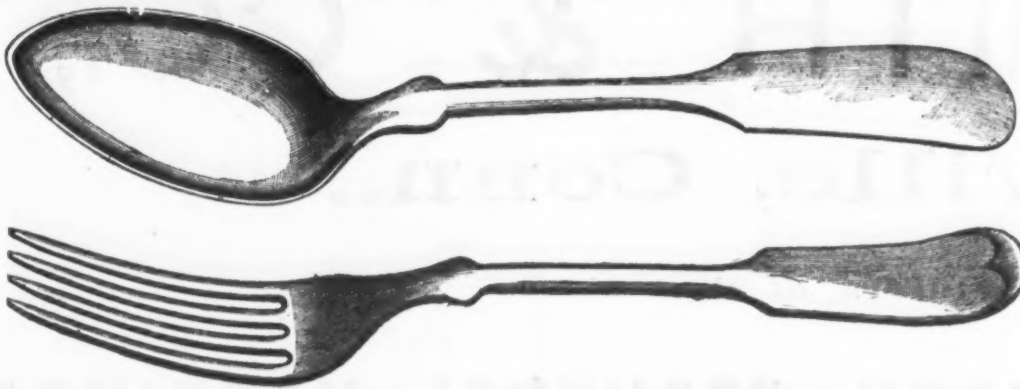
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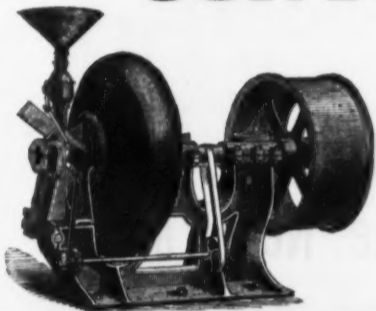


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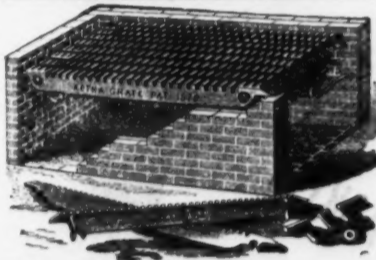
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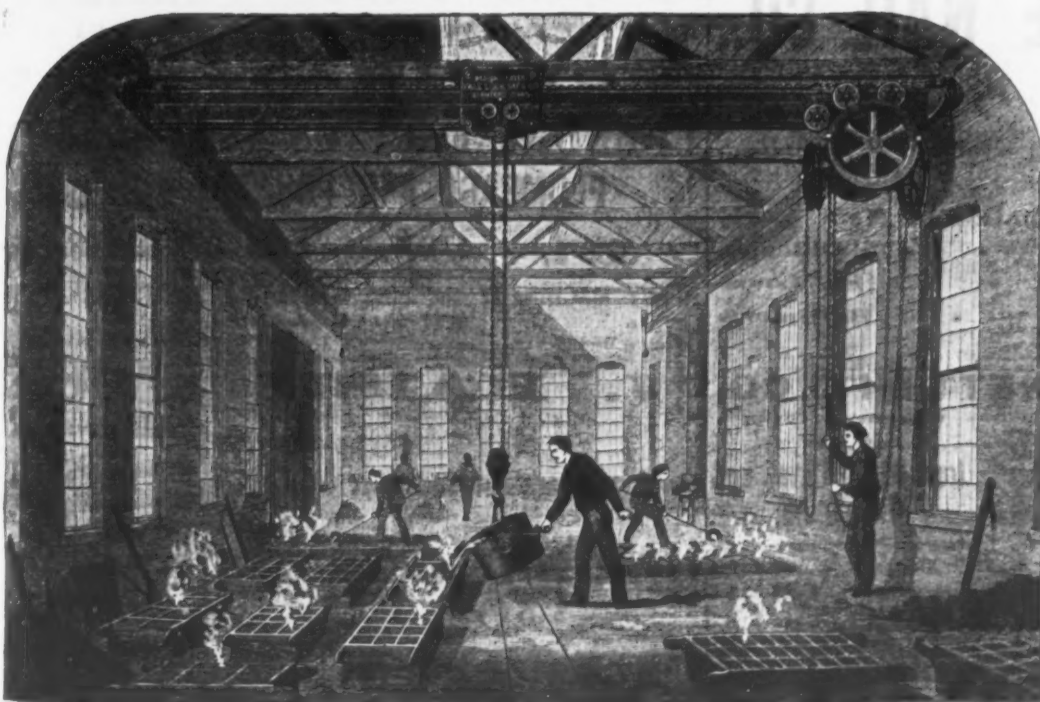
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Circulars on application. Full specification and tender submitted on receipt of capacity and span of bridge desired.

Works, at Wellsville, of which they are the chief owners.

The mill and furnace of the New York and Ohio Iron and Steel Co., at Ironton, were offered for sale at auction on March 1, without any purchaser being found. It is now understood that the company will add a nail mill to their plant.

The new sheet mill at Martin's Ferry will probably get into operation some time this week.

ILLINOIS.

There is a probability that the Union Iron and Steel Co. will early resume operations, all arrangements having been nearly completed, as indicated in the following circular letter, dated February 25, issued by the directors to the stockholders:

You are hereby notified that at a meeting of the directors of said company, held this day, a resolution was passed calling a meeting of the stockholders of the Union Iron and Steel Co. on Monday, March 12, 1883, at 10 o'clock a. m., at the office of said company, at No. 89 Madison street, Chicago, to take into consideration a proposition of said board of directors to increase the capital stock of said company to \$3,000,000, making all above \$1,600,000 preferred stock, and to draw dividends annually at a rate to be determined by said stockholders, before common stock draws any dividend, and authorizing the payment for said stock either in money or in the indebtedness of said company.

It is desired that every share of stock should be represented at said meeting. The president's statement shows assets of said company to the amount of \$5,000,000, and liabilities to the amount of \$3,292,441.42. By order of the Board of Directors.

L. S. BOOMER, Secretary.

The company have a large stock of raw material, and one of the most modern merchant mills, and there is a good demand for the product.

The Chicago Hardware Mfg. Co. propose to increase the capacity of their works 100 per cent. in a month or so.

The ornamental-iron works of J. L. Pfatt, at Quincy, were recently incorporated, under the State laws, as the Aetna Iron Works, with a paid-up capital of \$60,000.

The June Mfg. Co., of Chicago, makers of special machinery, are about to build a new four-story brick factory, which they hope to have ready for occupancy by May 1.

TENNESSEE.

Messrs. J. C. Anderson & F. H. Caldwell have established in Chattanooga a handle factory, which has been in operation nearly a year and has proved quite successful. The building is 40 x 120 feet. They operate six lathes, which put out 200 dozen daily, consisting of ax, pick, machinists', house carpenters' and coal miners' handles. The firm find the second growth hickory of the Tennessee Valley and mountains on either side the best of material for their purposes, and have a ready sale for their products. They employ 30 hands at the factory, and carry a heavy stock of raw material.

MISSOURI.

The Standard Foundry Co., of St. Louis, will, on April 1, increase their capital stock. Their new additions will soon be completed, and will largely increase their capacity.

A contract has been made between the Harrison Wire Co. and the Marsh & Harwood Co., of St. Louis, whereby the waste-acid product from the wire works is to be utilized in the manufacture of copperas. A works is being erected near the wire plant for the purpose. It is estimated that the product saved hereafter will be worth several thousand dollars every year.

The Groom Shovel Co., of St. Louis, are running full, single turn. They report themselves so crowded with orders that they are taking none for earlier delivery than April.

TENNESSEE.

The Roane Iron Co., of Chattanooga, have again shut down their mill, and it is not known when they will resume work. The stoppage is caused by lack of orders; 300 men are thrown out of employment.

WEST VIRGINIA.

Mr. H. M. Priest has been elected president of the La Belle Iron Works, of Wheeling, vice Mr. W. H. Harden, resigned. Mr. Priest was formerly secretary of the Jefferson Iron Works, of Steubenville, Ohio, which are virtually under the same management as the La Belle.

MICHIGAN.

Stack No. 2 of the Pioneer Furnaces has been blown out on account of low prices for pig iron, and will be overhauled and repaired during the idleness. The force of wood-choppers has been reduced considerably.

LABOR AND WAGES.

The rolling mill of Potts Brothers, at Pottstown, stopped five weeks ago because of uncertainty about the tariff, was restarted on March 6. After one heat the puddlers and their helpers refused to work, on account of a notification of a reduction in the wages of the puddlers to \$3.50 per ton, and of 8 per cent. in the wages of the other men. The firm say they "started the mill solely to give the men work, as they had not a single order on hand." Some trouble has also occurred at the mill of the Pottstown Iron Co., owing to a reduction in wages.

The strike at the works of the Centralia (Ill.) Iron and Nail Co. has ended by the strikers accepting the terms of the company.

The workmen of the Springfield (Ill.) Iron Co. held a meeting on March 9 to protest against the action of the District Executive Committee in ordering a strike. Dictation by the Amalgamated Association was repudiated, the strike denounced as unwarranted, and the iron companies sustained by the men in resolutions adopted.

The district meeting of the Amalgamated Association, in Pittsburgh, March 10, for the purpose of considering the scales of wages for the year beginning June 1, was largely

attended and long drawn out as meetings of that kind usually are. It was called to order shortly after 2 o'clock in the afternoon, and did not adjourn until after 7. When the doors were opened the only information given officially was that First Vice-president Keeny had presided, that E. A. McAninch officiated as secretary, and that 16 delegates to the scale convention had been chosen. This scale convention is the first national gathering of the kind in the history of the association. It will meet in Pittsburgh on the 7th of April, and will formulate the scales, the acceptance of which will be demanded in all districts. The delegates chosen at the meeting, with the 20 representing other sections of the country, have power to arrange the scales, presumably in accordance with the wishes expressed by their constituents. What these are cannot be ascertained officially at this time, but it is stated that while the puddlers and muck rollers are content to work at present wages, the finishers will ask that their scale be based on plate instead of bar iron, on account of the extent to which specialties are manufactured. If this is done their wages will be increased from 15 to 20 per cent. Puddlers say they will not unite in a strike for this purpose, and manufacturers say a demand for any increase will be steadily resisted. Meetings were also held Saturday in Youngstown, Wheeling, Bellefield (Ill.), Covington (Ky.), Philadelphia, and one other city. Reports indicate that all were more or less animated, but no particulars, save that delegates to the scale convention were elected, could be obtained.

The 90 employees of the Reading Hardware Co., who a few days ago asked for an increase of 10 per cent. in their wages, received an answer on March 8, granting their request, to take effect March 12. A similar notice was given the proprietors of the Pennsylvania Hardware Works, but they have two weeks' time in which to answer, and the proprietors say they do not intend giving their answer before the end of that time. It is probable their demands will be acceded to.

Employees of Brown, Bonnell & Co., Youngstown, have been paid the money due them for labor performed by them up to the time that the mills were shut down and possession taken by Receiver Brown. The amount paid out reached the sum of \$60,000, and caused a feeling of satisfaction among all classes.

Gases in Steel Castings.

Dr. Frederick Müller, of Brandenburg, Germany, whose views concerning the question of gases in steel castings were published in our issue of January 25, 1883, has submitted the following reply to M. Pourcel, who, as will be remembered, vigorously attacked Doctor Müller's theory at that time:

Pending the publication of the results of my thorough investigations into the importance of silicon in the metallurgy of iron, I beg to correct a few misapprehensions and errors contained in the published letter of M. Pourcel. That letter criticises merely the introduction to my paper on the gas secretions in steel castings, and only a secondary matter then. The chief argument of the introduction, viz., the strong secretion of gases from completely decarbonized iron, is not touched upon. I am prepared to prove that pig iron—not white pig alone—poured direct from either the blast or cupola furnace, often gives castings full of blisters. In this, as in other cases, the phenomenon can only be explained on the theory of the secretion of previously absorbed gases, and it is thus incomprehensible why, as regards the intermediate product, the complicated reaction theory should be adopted instead of the absorption theory. Nevertheless, as already stated, these arguments are only of secondary importance. The pith of the matter is the absence of carbonic oxide in the pores and the presence of hydrogen and nitrogen.

Now, M. Pourcel does not question the accuracy of my experiments, but nevertheless is continually speaking of escaping hydrogen. I have reviewed the whole of my experiments, not, however, with the idea of refuting M. Pourcel's conclusions, but for the purpose of showing that Mr. Snelus, Mr. Windsor Richards and others are in error in supposing that the large volume of hydrogen given off was due to the decomposition of the water surrounding the borer during the boring. In other respects my paper is not controversial, there being only a few polemical sentences in which I endeavour to defend myself from attack. M. Pourcel, on the contrary, is continually attacking me. Two years ago I was compelled to oppose him and his followers. That matter, however, is now buried. It is not true, as stated by M. Pourcel at Vienna, that I had roughly treated his theory. I had not till then attacked his theory in any way—indeed, I did not know he had propounded any particular theory.

M. Pourcel's published letter addresses itself pointedly to me. "No, Doctor Müller, silicon does not increase the giving off of the gases in steel, but quite the contrary. It will be known to you that Troost and Hautefeuille have established by experiment that silicon almost entirely prevents the release of hydrogen from steel." I reply that Troost and Hautefeuille have only stated that manganese iron melted in an atmosphere impregnated with hydrogen splutters strongly on cooling, while silicious iron does not. From this there can be no other conclusion than that the molten manganese iron in a very high temperature absorbs more gas than is possible at the melting point only. Silicious iron, on the contrary, has no greater absorption capacity at a higher temperature than when cooling. This fact, however, is quite irrelevant to my theory. It is merely a question whether the set metal, largely alloyed with silicon, could retain a greater quantity of hydrogen. That this is the case the investigations of well-known natural philosophers have already shown; 500 kg. of pig iron took up 46.6 c. cm. of hydrogen; cast steel, 7.8, and hammered iron, 13.9. Quite recently the careful experiments of Professor Ledebur with ferromanganese have shown how silicon enables both alloys to retain a large quantity of hydrogen. It is worthy of remark that this distinguished scientist—a metallurgist, and not, like M. Pourcel's friend, a mere chemist

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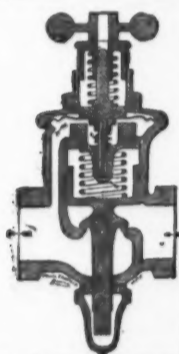
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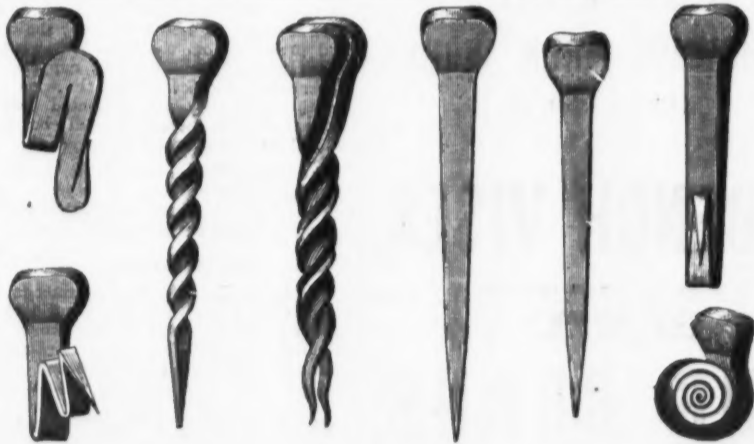
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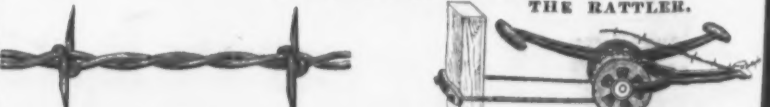
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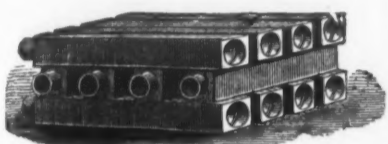
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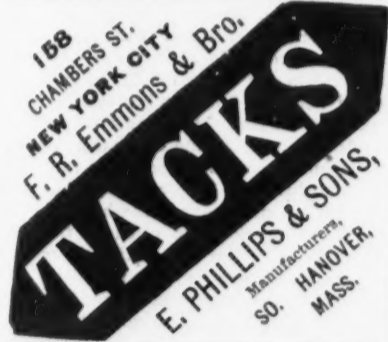


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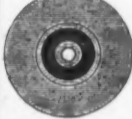
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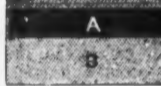
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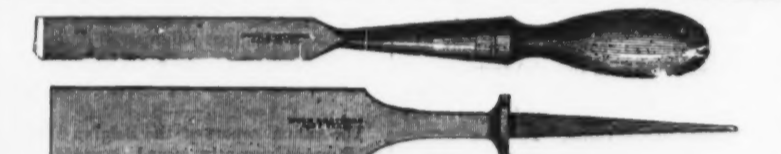


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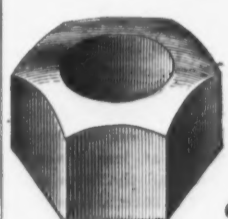
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—has given expression to the very opinions that I at the same time, but quite independently, had arrived at. From these experiments we have also an ocular demonstration direct from the blast-furnace practice—namely, the experiment of—M. Pourcel! "The metal alloyed with silicious manganese develops on cooling, not carbonic oxide, but yields hydrogen flames, which burn on the upper surface during the casting. If, however, the silicon is added in the form of iron silicate, and the steel contains only traces of manganese, no trace of gas is developed."

As we are not concerned at present with the rôle which manganese plays, we will content ourselves with stating that the steel in question contains hydrogen, but of this not a trace is secreted when silicon is added; and, further, that through the described experiments the giving off of hydrogen in silicious iron is positively proved. My observation that in the Bessemer process a powerful spiegel reaction produces solid steel, while feeble reaction, in spite of a high percentage of silicon, results in porous ingots, has been entirely misapprehended by M. Pourcel. I spoke of charges not blown with sufficient force, which, consequently, give no, or only a feeble, spiegel reaction. The slag in all the charges on which I experimented was very fluid—as, indeed, considering the high percentage of manganese in the charge, it could not otherwise be.

The fact, stated by myself and others, is that if the blow is interrupted before the bath becomes strongly oxidized, after the spiegel addition and with considerable silicon still remaining, "rising" steel results. If, however, the blow is continued a short time longer, so that a strong oxidation and powerful reaction results, the same bath will yield solid steel. I maintain this solidifying to be the effect of a strong spiegel reaction, the powerful intermolecular development of carbonic oxide mechanically carrying off the dissolved hydrogen and nitrogen, and this I have proved by gas analysis. As regards the participation of any particular element in effecting deoxidation at the conclusion of the Bessemer and Martin processes, I have already stated that as the result of my experiments silicon is found to play a very subordinate part.

M. Pourcel, however, brings forward 1000 analyses against my two, in order to show that on the addition of silicide one-third of the silicon is consumed. I have now investigated at various German Bessemer works six cases of spiegel reaction, in four of which there was no noticeable decrease in the silicon, and in the other two, on the contrary, an appreciable increase. These observations confirm what previously was conjectured, that, owing to the extremely high temperature at the end of the blow in the German Bessemer process, the oxygen of the bath exerts a predominating influence upon the carbon and manganese. I am prepared to admit that a small quantity of silicon is oxidized, but this loss is more than compensated for by the amount of silicon yielded by the lining. I have myself investigated a reaction in the Martin process, and have received a report on two other similar investigations. Neither of these shows any consumption of silicon. I will, however, shortly extend my observations so as to obtain more conclusive evidence on this point. The deoxidation process was carried out by adding ferromanganese first, and then, when this had operated, iron silicide was introduced. Consequently, ferromanganese produced the entire reaction. A sample taken after the addition of the ferromanganese showed some pores, and not till silicide had been added were absolutely solid ingots obtained. As regards M. Pourcel's 1000 analyses at the Martin Works, of Terre Noire, I would remark that in the Martin process it is impossible to properly study the spiegel reaction. It cannot be ascertained, therefore, how much is actually consumed by deoxidation. I hope in my later report to give some decisive evidence on this question. In the Thomas process the slag is first of all removed as completely as possible, and then the process of deoxidation is carried out with various silicon-containing fluxes. Reaction is thus obtained at a very high temperature without disturbing auxiliary processes.

In order also to observe an analogous example at a lower temperature, the same metal was poured in an oxidized condition into a mold, and cold silicide or other flux added little by little. As for the rest, it is maintained that the study of the deoxidation reaction is a matter by itself, which can determine nothing as regards the absorption and reaction theory. Whether silicon participates in this or not, the quantity of it in steel remains practically unchanged, and this enables it to retain a greater amount of hydrogen, by which means the formation of pores is suppressed. Still less than in the deoxidation process can the question at issue be decided during the operations of the Martin process. Carbonic oxide is regularly developed in this latter process, and it is quite superfluous for M. Pourcel to say that by the addition of silicide the development of gas is diminished. This is perfectly self-evident to any intelligent metallurgist. In the ladle, also, owing to the more complete mixing of the elements, a further formation of carbonic oxide goes on. Nevertheless, I am of opinion that when even the wildest steel has, after standing for a long time in the ladle, become quiet, the reaction is completely at an end.

It is contrary to all experience that two readily combining fluids poured together and stirred up should not mix perfectly, not even after the whole has been again poured into a vessel with some force from a tolerable height. Most of my boring experiments were made on quiet-rising steel, rich in silicon and manganese. These samples of steel on being poured into the ladle remained absolutely quiet. In the mold also the metal stood quiet for about 10 seconds, and then, without ebullition, began quietly to rise. The gas secretion commences to form the worm-like tubes after a long, quiet pause, and when the metal is cooling. It is impossible that it can proceed from a renewed spiegel reaction. Only those who are ignorant of chemistry could maintain this to be the case. But we can conclusively ascertain whether the renewed formation of carbonic oxide is theoretically possible or not, for the pores contain, as a matter of fact, no carbonic

acid. They contain hydrogen, with from 10 to 20 per cent. of nitrogen. Moreover, hydrogen can never be produced by means of an oxidizing reaction. M. Pourcel claims Professor Wedding as a supporter of his theory, and accuses me of ignoring the fact. I have not mentioned any names except those of my chief opponents, not even Professor Bauermann, who alone at Vienna accepted the hydrogen theory. The English reports of Doctor Wedding's share in the discussion appear to me incorrect; in fact, the *Ironmonger* supplement of November 11 makes certain corrections at Doctor Wedding's request. Nevertheless, I do not at present understand to which theory Doctor Wedding inclines. He says, indeed, that certain synthetic experiments support M. Pourcel, and adds: "It is clear that, as long as silicon is added to nearly pure iron, all carbonic oxide, whether soluble or mixed with the iron, would be reduced to carbon, which unites with the iron, and the blisters, therefore, cannot contain any further carbonic oxide." This conclusion supports my own contention. The blisters contain, as a matter of fact, no carbonic oxide, but hydrogen and nitrogen—caused, however, in no way by reaction. Until an ingot is found whose pores, contrary to rule, contain a predominating amount of carbonic oxide, it appears to me quite immaterial to consider whether this element might yet be present, if this or that hypothetical reaction did or did not take place in steel. In his well-known text-book Doctor Wedding considers both reaction and absorption as possible. In reference to Bessemer steel, he says, on page 394: "A second peculiarity of the Bessemer product consists in the gases which are either mechanically dissolved or formed by chemical reactions in the preparation of the castings, and which, on the hardening of the metal, partly escape and partly remain inclosed, forming hollow spaces." In reference to Martin steel, he says, page 549: "Its peculiar adaptability and superiority over Bessemer steel for special castings is due wholly to its greater freedom from absorbed gases." The Berlin syntheses alluded to can be expressed in the following equation, showing the alternate working:



This reaction is, from the chemical standpoint, not at all improbable, and was years ago discovered by Caron. But it has been established that it can only take place at a proportionately low temperature—at red heat, in fact. At the heat at which steel melts the ratio is reversed, owing to the extraordinarily increased affinity of the carbon for the oxygen. These reciprocal reactions are widely common in chemistry. For example, potassium at a low temperature reduces carbonic acid to carbon, while at a white heat the potassium oxide is reduced by the carbon. Corresponding to this reaction in our case is—



This shows, primarily, silicon in the iron inside the blast furnace. Also in the Bessemer and Martin acid processes silicon is taken up and carbonic acid is formed. Now, M. Pourcel attaches a special importance to this reaction and gives in his letter a series of new proofs. But the above reciprocal reaction mentioned by Doctor Wedding does not take place at a steel-melting heat, and M. Pourcel, at Vienna, on the contrary, expressly stated that he had always maintained this. Laboratory syntheses are only of value in studying the metallurgy of iron when conducted with extreme care, because the temperatures at which the experiments are conducted do not approach the degree of heat to which liquid steel and iron are raised in the blast furnace.

Wages in the Sheffield File Trade.

Mr. S. Uttley, secretary of the Filecutters' Association, has, on behalf of the executive, addressed a circular to the file manufacturers on the question of wages. The Manufacturers' Association asked the men to allow the 10 per cent. from the statement price returned to them last May. The men declined to do so on the ground that their wages were low enough already; that there were comparatively few of their number unemployed, and that the season when business might be expected to be most brisk is only commencing. The employers urged that in several instances the discount had been allowed, and that all should be on the same footing. The men replied that such cases were rare and only submitted to under pressure, and that in the interest of the trade generally manufacturers should endeavor to uphold the statement price. The manufacturers met on Tuesday and resolved: "That, having heard the report of the committee and replies of the three branches of the file workmen, this meeting regrets that the workmen are unwilling to concede the discount restored to them in May last, and is of opinion that, while several manufacturers are now having the discount allowed, and are consequently able to undersell those who pay the statement prices, it is impossible for the full prices to be continued, and hereby rescind the resolution of April 6, 1882."

The Filecutters' Association reply, through their secretary, under date February 15, as follows: "As workmen, we hereby protest against and positively decline to accept the ruling for the trade of a meeting consisting of 21 manufacturers of files, representing 20 firms, out of upward of 80, such meeting having no power, either in point of numbers present or representative character, to pass any resolution bearing upon the question of prices to be paid to the workmen for their labor. Further, that portion of the resolution referring to several manufacturers now having the discounts allowed them is misleading, and calculated to cause many manufacturers to suppose that the society allows this privilege to some manufacturers while denying it to others. This we positively deny, the union having always taken steps to check discounts and maintain the uniform rate of wages agreed upon jointly by manufacturers and workmen. In conclusion, prior to any attempt to reduce the standard price for cutting files and rasps, we demand, as our legal right, a month's notice, the manufacturers having always claimed and been willingly allowed the same by the workmen whenever there has been an advance of wages in question."

The Iron Age

AND

Metallurgical Review.

New York, Thursday, March 15, 1883.

DAVID WILLIAMS, Publisher and Proprietor.
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One square (12 lines, one inch), one insertion, \$2.50; one month, \$7.50; three months, \$15.00; six months, \$25.00; one year, \$45.00; payable in advance.

BRITISH AGENCY.

Office of The Ironmonger, 44a Cannon St., London.

DAVID WILLIAMS, Publisher, 83 Rende Street, New York.

PITTSBURGH: 77 Fourth Avenue, Jos. D. Weeks, Manager and Associate Editor.

PHILADELPHIA: 320 South Fourth Street, T. H. Hosmer, Manager.

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Our Imports and Exports of Iron and Steel.

The United States Bureau of Statistics has recently issued a statement from which we compile the following table, showing the value of the imports of iron and steel into this country in the calendar year 1882, as compared with 1881:

Articles.	1881.	1882.
Pig iron.....	\$8,943,465	\$9,896,669
Castings.....	37,628	115,691
Bar iron.....	2,075,151	3,304,957
Boiler iron.....	9,784	12,011
Band, hoop, &c.....	28,295	208,825
Iron rails.....	3,464,989	1,077,059
Steel rails.....	7,649,498	5,403,980
Sheet iron.....	613,810	794,017
Tin plates.....	14,886,927	17,975,101
Scrap iron.....	2,705,072	2,736,483
Anchors, chains, &c.....	124,390	142,108
Hardware.....	84,013	77,965
Machinery.....	1,719,486	2,975,753
Firearms.....	1,344,004	1,650,340
Steel ingots, &c.....	9,949,213	19,949,213
Cutlery.....	1,954,317	2,027,496
Files.....	108,506	160,885
Saws and tools.....	24,295	34,775
Other manufactures.....	5,771,691	6,177,077
Total.....	\$61,555,077	\$67,075,125

The weight of all the above articles is not given in the Government reports, but so far as they are to be ascertained, they are as follows:

Articles.	1881.	1882.
Pig iron.....	465,039	540,340
Castings.....	259	1,156
Bar iron.....	42,696	70,738
Boiler iron.....	259	1,156
Band, hoop, &c.....	738	5,379
Iron rails.....	122,133	37,493
Steel rails.....	222,507	162,181
Sheet iron.....	7,251	11,524
Tin plates.....	183,005	213,086
Scrap iron.....	134,917	147,936
Anchors, chains, &c.....	1,357	1,366
Total.....	1,180,749	1,192,295

The value of the exports of iron and steel from this country in 1882, as compared with 1881, is shown in the table below:

Articles.	1881.	1882.
Pig iron.....	\$184,354	\$185,221
Castings.....	32,125	60,645
Bar iron.....	5,578	34,425
Boiler iron.....	34,878	126,878
Iron rails.....	7,193	81,350
Steel rails.....	8,895	21,537
Sheet, band and hoop iron.....	8,895	21,537
Steel ingots, bars, sheets, and wire.....	45,457	89,076
Nails and spikes.....	330,053	330,753
Car wheels.....	139,222	149,320
Stoves and parts of.....	142,007	81,158
Other castings.....	288,005	378,884
Steam engines, stationary.....	88,158	183,211
Steam engines, locomotive.....	92,052	1,878,528
Boilers, separate.....	183,413	183,413
All other machinery.....	4,877,698	6,120,244
All other manufactures of iron.....	5,766,464	6,490,223
Cutlery.....	95,558	91,994
Edge tools.....	1,115,156	997,038
Files and saws.....	42,355	68,210
Firearms.....	1,018,471	927,180
All other manufactures of steel.....	560,090	453,404
Total.....	\$15,782,000	\$19,020,759

Of the above articles, the weight of all that can be ascertained was as follows in 1882, as compared with 1881:

Articles.	1881.	1882.
Pig iron.....	6,158	5,576
Bar iron.....	450	758
Boiler iron.....	39	39
Iron rails.....	531	2,248
Steel rails.....	77	971
Sheet, band and hoop iron.....	128	348
Steel ingots, bars, sheets and wire.....	210	1,109
Nails and spikes.....	4,280	3,618
Total.....	11,628	13,766

It would be very satisfactory to be able to make comparisons from year to year of our imports and exports of iron and steel by weight, but that is not possible, for a variety of reasons. One reason is that the Bureau of Statistics does not obtain nor publish the weight of some of the heavy products, the duty on which is levied at an ad valorem rate, and not at so much per pound or per ton. Another is that a great many iron and steel articles are sold at an individual price, and not by weight. In dealing with import and export statistics, therefore, it is inevitable that values be compared, especially when reference is made to the imports or exports in mass, and not in detail.

In the calendar year 1882 the United States imported more iron and steel than in any previous year except two—1872 and 1880. Both of the excepted years were seasons of high-pressure activity, however, while 1882 was a year of steady trade without any excitement whatever. As compared with the imports for 1881, the value of the iron and steel imports for 1882, including tin plate, was \$5,520,048 greater. As compared with 1872, the imports for 1882 were \$8,542,552 less, and, as compared with 1880, they were \$13,368,337 less. The year of lowest iron and steel imports for many years was 1878, when their value was \$49,062,115 less than for 1882. The value of these imports for each calendar year from 1871 is shown in the following table:

1871.....	\$37,856,209	1877.....	\$19,874,399
1872.....	75,617,679	1878.....	18,011,016
1873.....	60,005,538	1879.....	33,381,569
1874.....	37,624,192	1880.....	80,443,378
1875.....	27,369,101	1881.....	61,555,077
1876.....	20,016,609	1882.....	67,075,125

In 1871 nearly one-third of the entire value of the iron and steel imports was represented by iron rails alone, but in 1882 iron rails amounted to less than one-sixtieth part of these imports. In 1871 tin plates covered one-sixth of the iron and steel imports, in 1877 over one-half, and in 1882 over one-fourth. In 1871 steel ingots, bars, &c., represented one-seventeenth of the imports, but in 1882 they amounted to nearly one-fifth.

In 1882 we imported more tin plate than in any previous year, and more castings, more machinery, more firearms and more steel blooms and ingots. The importation of pig iron was only surpassed in one previous year—1880. The domestic manufacturers of hardware, saws and tool and boiler plate seem to have been able to hold their own very well against the active foreign competition of last year, as the importations in these lines were comparatively small.

The exports of iron and steel for 1882 show a very gratifying increase over previous years, amounting, as they did, to \$19,020,759, against \$15,782,000 in 1881 and \$12,960,995 in 1880. The following table of exports of iron and steel from the United States since 1871 will show how very favorable 1882 compares with its predecessors:

1871.....	\$11,816,137	1877.....	\$16,659,675
1872.....	10,030,125	1878.....	11,260,350
1873.....	12,120,039	1879.....	12,470,448
1874.....	11,389,807	1880.....	12,000,095
1875.....	16,092,006	1881.....	15,782,000
1876.....	11,793,459	1882.....	19,020,759

In 1871 nearly one-half of the value of our iron and steel exports was comprised under the head of firearms, but in 1882 only one-twentieth of the exports consisted of these articles. In 1871 only one-fourth of our exports consisted of machinery, locomotives, stationary engines and boilers, while in 1882 they composed nearly one-half of the exports. In the less advanced forms of manufactured iron, such as pig iron, rails and other rolled iron, &c., our exports are somewhat small, but still they show growth; in 1882 they reached a value of \$879,868, against \$31,063 in the previous year.

Comparison of the value of the imports with the exports of each year since 1871 shows that the imports have invariably exceeded the exports, but the excess has fluctuated remarkably. We have ascertained the excess of the imports over the exports for each of the years named, and present it below:

1871.....	\$46,030,162	1877.....	\$3,214,724
1872.....	65,487,552	1878.....	4,792,641
1873.....	47,875,599	1879.....	20,861,721
1874.....	22,262,385	1880.....	67,482,167
1875.....	11,270,195	1881.....	45,778,975
1876.....	8,218,144	1882.....	48,045,365

From the above figures it will be seen that in 1877 there was a difference of but a little over \$3,000,000 between the value of our imports of iron and steel and the value of our exports, but only three years later that difference swelled to over \$67,000,000. The total value of these imports in the 12 years referred to was \$558,813,952, while the exports only amounted to \$167,440,821; hence the imports of iron and steel were \$391,373,131 greater than the exports. These figures demonstrate what enormous quantities of iron and steel we must have been importing in recent years, and the vast amount of money we have been paying to foreign countries for them. The average yearly excess of these imports over the exports for the past 12 years was \$32,614,427, and the monthly average excess of imports for the whole time was \$2,717,869.

Probable Effect of the New Tariff on Metals other than Iron and Steel.

In such discussion of the effects of the new tariff as there has thus far been time for, more attention has been given to iron and steel than to other metals of commerce. In this article we propose to consider its influence upon the copper, tin, lead and spelter trades.

The duty on ingot copper is reduced from 5 cents to 4 cents; black and cement (the pure copper contained therein) from 4 cents to 3½ cents; old copper from 4 cents to 3 cents, and the fine copper contained in ore from 3 cents to 2½ cents. To what extent ore may be imported, worked, and the copper either retained in the country or re-exported to get the drawback on it, cannot be judged at present, as it will depend on circumstances. It will be different, however, with the following clause: "Sulphur ore, as pyrites or sulphuret of iron in its natural state, containing not more than 3½ per cent. of copper, 75 cents per ton; Provided, that ore containing more than 2 per cent. of copper shall pay, in addition thereto, 2½ cents per pound for the copper contained therein." This throws the door open to importation of Spanish pyrites from the Rio Tinto and other neighboring mines in the vicinity of Huelva, Andalusia, which are utilized for the manufacture of sulphuric acid. The lower grades contain in the neighborhood of 2 per cent. pure copper. Until lately these ores were chiefly used in England for making sulphuric acid, but as the demand for the latter has lessened in that country, a market for Rio Tinto ores has been found elsewhere, particularly in France and the United States. Under the provisions of this clause some copper may get into the United States duty free, to what extent it is impossible to say, but the amounts may eventually be considerable, since 2 per cent. on a ton of ore of 2240 pounds would amount to something like 45 pounds of pure copper. The mines named turn out ore at an extraordinary rate, possessing every facility for rapid work. The ore is handy and near the coast, where a short railway lands it on the dock, while freights thence this way are most of the time very low.

As we produce at present an excess of copper, any additional foreign supply, though it be moderate, if exempt from duty would hasten the inevitable drop in values that seems to impend. This we need not dwell on. When, therefore, the metal trade quietly sat down to study the details of the new law as framed, they saw that this apparently harmless clause might eventually prove the last straw, loaded down as we are with overproduction.

The duty on brass, in pigs and bars, is to be 1½ cents, while brass goods are to pay 35 per cent., instead of 45 per cent. Under the latter duty we imported last year \$694,997 worth of brass goods, against \$558,643 in 1881. We do not think that the 10 per cent. reduction will raise the amount

during the next 12 months to any appreciable degree. On the other hand, our export of domestic brass goods did not exceed last year the trifling of \$265,590, against \$320,811 the previous one, showing that in this item we have, so to speak, no outlet abroad. Of gas fixtures and chandeliers we shipped only \$42,816 worth, against \$24,752 in 1881, and cartridges, \$370,582, against \$396,250; of other copper manufactures, \$112,246, against \$60,222; together, \$791,234 worth of manufactures, against \$802,035 in 1881.

A large export of copper, it seems to us, will be necessary this year, since not unlikely, so far as we are able to judge at this early stage, we may have to spare consumers on the other side some 30,000,000 pounds. The chief Lake producers might adopt the heroic policy of bringing down the price of Lake copper themselves to a point that would kill off the smaller mines there and thus ease the situation. This course, however, they do not seem inclined to follow, but appear ready, from what we hear, to meet the European market.

Tin plates, from 1.1 cents duty per pound, have been reduced to 1 cent, a reduction equal to 11 cents on I. C. tins and 14 cents on I. X. tins, per box, a reduction not likely to influence the amount consumed.

Old lead will henceforth pay 2 cents, the same as pig, whereas formerly it paid 1½ cents. This will not make any difference in the amount realized; in fact, the old lead is received for the most part from countries south of us, in trifling amounts, and the shipper cares little whether the duty deducted is ½ cent more or less. This may likewise be said of old spelter and zinc, the duty on which is to be the same as on slabs—1½ cents, instead of 1¼ cents, as heretofore; and sheet zinc is raised from 2½ cents to 2½ cents, which will not, we should say, affect importation, which takes place usually by fits and starts, whenever the domestic production seemingly does not suffice to cover a sudden demand and the steam freight rates are low, to cease again for months in succession.

After thus reviewing the various items that have undergone any modification, we find most of the changes perfectly harmless either way, except, as we have shown, in the case of certain ores with a small percentage of copper. As it was pretty generally understood while the agony of this tariff revision lasted that metals would hardly be touched, the suspense did not interfere with operations in the least beyond the usual general lull in business while tariff tinkering is going on, and when the final result was known it produced no excitement, with the exception of the pyrite clause opening possibilities of additional supplies of copper from a source not looked upon as of much account till then. At any rate, in common with other branches, the metal trade is glad to be rid of this incubus of legislative agitation and doubt. A fresh leaf may now be turned over, and everybody may plan his enterprise according to his best judgment.

Belgian Railroad Management.

The annual report of the Belgian Minister of Finance, recently issued, contains some interesting and suggestive figures relating to the average yearly net earnings, the charges for interest, rentals, &c., and the excess or deficit of each period of five years since 1852, together with estimates of the results for three years, as follows:

	Net earnings.	Interest and other charges.	Profit.
1853 to 1857.....	\$1,967,467	\$1,549,559	\$417,715
1858 to 1862.....	2,710,741	2,853,393	\$142,654
1863 to 1867.....	2,917,968	3,197,344	\$279,376
1868 to 1872.....	3,434,738	2,635,170	\$799,568
1873 to 1877.....	4,005,684	5,276,301	\$1,270,617
1878 to 1882.....	7,789,399	8,601,532	\$812,133
Estimates—			
1883 to 1887.....	8,090,000	9,604,054	\$1,514,054
1888 to 1892.....	8,300,000	10,200,502	\$1,900,502
1893 to 1897.....	8,600,000	10,634,898	\$2,034,898

Even a superficial inspection of this statement shows that the interest and other charges are growing much faster than the profits, and, under these circumstances, it is but natural to anticipate steadily and annually increasing losses. Without looking forward to the ultimate result of this unfavorable movement, we would simply remark that the State railroad system, as now in vogue in Belgium and several other European countries, has given rise to results such as were obtained in France some time since. The system does not seem to work as well as was anticipated, at least from a financial point of view, and the favor which it appears to meet in several European States must therefore undoubtedly be attributed to some other cause. The losses suffered in some instances are due to the fact that the roads in question pass through districts in which traffic is light, and consequently insufficient to yield an adequate return for the expenses incurred.

It may, of course, be claimed that the same result would be arrived at in case the lines were controlled by private companies, but it should be remembered that in such cases taxpayers could not be expected to make up the resulting deficiencies, and the losses entailed would have to be borne by comparatively few interested persons. It should also be remembered that private companies would consider any project of this kind carefully in all its details, and study it thoroughly before entering upon actual construction; in fact, every effort would be made to ascertain the probable nature of the final result, thus limiting the chances of failure. Interested persons, on the other hand, may, by a judicious exercise of political influence,

cause the construction of a Government road in any special district where the amount of traffic and consequent earnings would actually not warrant such a course, and it is this special point alone which deserves attention. The result of the past few years' experience in this particular direction is such, we think, as to give no very great degree of encouragement to the practice of placing railways under Government control, and though adopted in several European States its flourishing growth is, to say the least, improbable.

The Constitutionality of the Tariff Bill.

The question of the constitutionality of the tariff bill, which was treated so gingerly by the House of Representatives, does not pass out of mind or discussion so readily as at first sight seemed probable, and we have evidence that there is a serious intention on the part of some parties to raise this question and take it to the Supreme Court, if, on investigation, there seems a probability that the Court will discuss the question. The point at issue, of course, is whether the tariff bill, in the shape that it came from the Senate, is in reality an amendment to the internal revenue bill sent to the Senate by the House last session. The Constitution gives the power to originate revenue bills solely to the House of Representatives, but concedes to the Senate the right to concur in amendments or to amend these bills. The House sent to the Senate last session a bill entitled "An Act to Reduce Internal Revenue Taxation." Every word of this act after the enacting clause is stricken out and an entire new bill, so far as relates to revenue, has been substituted, some of the provisions, however, being the same as in the House bill. In addition to this, an entire revision of the tariff is also made a part of the bill, and, to complete the total change in identity, the title is changed from "An Act to Reduce Internal Revenue Taxation" to "An Act to Reduce Internal Revenue Taxation and for Other Purposes."

Now, the question is, in the purview of the Constitution are these changes amendments? To the minds of many it is clear that they are not, but it may be a question like the old logical puzzle of the ship that carried the Grecian tribute, or the modern one of the jack-knife

duction of 1882 over 1881 was therefore 231,923 tons of ingots and 242,545 tons of rails. The percentage of increase was 16 for ingots and nearly 24 for rails. These figures show that Great Britain made more progress in increasing its output of steel last year than did the United States, for in that year we only gained 10 per cent. in the production of ingots and 8 per cent. in the production of Bessemer steel rails over the product of 1881. For several years the United States has disputed with Great Britain the honor of being the principal Bessemer-steel producing country in the world. In 1880 the mother country was beaten in its manufacture of both ingots and rails. In 1881 it was beaten in the manufacture of rails, but in the production of ingots it surpassed the United States. In 1882 honors were again divided, Great Britain producing the most ingots, but the United States rolling the most rails. The excess of the British production of ingots over the American production last year was 158,955 tons, and the excess of the American production of Bessemer steel rails over the British production was 19,284 tons. If, however, the comparison were confined to rails rolled from homemade blooms, the excess would be on the side of Great Britain, as some of our rails embraced in the above calculations were rolled from Transatlantic blooms.

Our Mexican Trade.

Some very interesting problems are presented in our future trade with Mexico. As matters stand, merchants in the United States are severely handicapped by English and French steamers, subsidized by their respective governments to the tune of about \$20,000 per trip, and a German line is soon to be started which will receive \$16,000 per trip. Of course, the effect of these subsidies is equivalent to a reduction of the rate of freight by our European competitors. The Mexican Government also, by virtue of an agreement made with the American line of steamships, fixes the rate of freight from Mexico. It is in consideration of this right that she grants \$2000 a trip, whether the steamer sails from New York or New Orleans. We understand that the American steamship proprietors apprehend still further disadvantages, to arise from efforts making in England to obtain a further control of Mexican trade. Already an agent is seeking to renew more friendly relations, with the object, it is alleged, of establishing a counterpoise to American influence.

A curious fact is stated by the Messrs. Alexandre, of the American line to Vera Cruz, illustrative of the present state of our trade relations with the Mexican Republic, to the effect that there was a time when the house of Collins & Co., of Connecticut, used to supply almost the whole of the Mexican demand for axes, machetes, or long knives, used by the peons and Indians, and cutlery generally. When the tariff came into operation this trade was cut into to such an extent as to almost ruin it. To show the extent of Collins & Co.'s business, it is mentioned that the Germans are selling to-day in Mexico axes and machetes having the Collins trade-mark and label upon them, although they are made in Germany. A business connection must be large before it becomes a paying matter to do this. As a remedy for existing difficulties the Messrs. Alexandre propose an extension of the bonding principle. They say that if a manufacturer who exports \$1000 worth of manufactured goods were allowed to bring in duty free, or with lessened duty, an equal amount of raw material, it would permit competition with European manufacturing centers. There used to be a rule by which high-grade refined sugars were allowed a rebate of duty—2½ per cent.—less 10 per cent. Under this rule there grew up a large trade in sugars of this kind. Raw sugars were imported, refined and exported, and the profit permitted the payment of the 10 per cent. of the duty. Could such an arrangement be made for all manufactures it would stimulate them in many ways.

Mention is also made of the pernicious working of our consular system, which encourages extortionate fees. An item of \$5 for a consular seal is a trifling tax on a shipment of goods worth \$200,000, but it is 5 per cent. on an invoice of only \$100, and enough to absorb a small share of the profits. Mr. Trescott and the other commissioners appointed to confer with the Mexican Minister Romero respecting our international trade relations, will find several delicate questions which require adjustment before trade with Mexico can be put on a basis promising much satisfaction or permanence.

Commerce of the Dominion.

The trade and navigation returns for the year 1881-82 were laid before the Dominion Parliament a few days ago, and show some unexpected results. Both the export and import trade have largely increased during the year, the former beyond precedent, and the latter was only exceeded in the years 1873, 1874 and 1875. It is also observed that exports to Great Britain have largely fallen off, while those to the United States have increased, and the imports from the United States have meanwhile increased in a greater ratio than those from Great Britain—indicating that, despite the encouragement given to commercial relations with "the

mother country," the people of the Dominion are becoming more closely allied in their material interests with whatever concerns their neighbors across the St. Lawrence boundary.

The value of the Dominion exports by countries in 1881 and 1882 was:

	1881.	1882.
Great Britain.....	53,751,570	45,274,461
United States.....	36,806,243	47,940,711
Other countries.....	78,300,833	8,978,531
Total.....	168,858,646	202,193,703

The following shows the imports for consumption:

	1881.	1882.
Great Britain.....	43,583,808	50,597,341
United States.....	36,704,112	48,289,052
Other countries.....	11,323,684	13,762,514
Total.....	91,611,604	112,648,907

It will be observed that the increased value of goods entered in 1882 is \$21,037,323, compared with the previous year; and if we go back to the date of confederation in 1868, the total excess of imports in the intervening period over exports is \$282,877,808, as appears from the following:

	Exports.	Imports.	Duty.
1868.....	\$57,557,838	\$73,450,744	\$8,370,431
1869.....	60,474,781	70,415,165	8,205,009
1870.....	73,573,490	74,814,339	9,462,940
1871.....	74,733,618	90,018,971	11,843,655
1872.....	84,030,053	111,430,527	13,043,243
1873.....	89,789,222	128,011,280	13,917,730
1874.....	89,351,928	128,213,582	14,421,824
1875.....	77,886,079	123,070,283	15,361,382
1876.....	80,066,435	91,200,346	12,831,114
1877.....	75,075,931	99,127,969	12,548,451
1878.....	79,323,667	93,081,787	12,793,633
1879.....	77,401,255	81,064,437	12,930,540
1880.....	87,011,458	86,409,747	24,138,849
1881.....	98,200,823	104,330,840	28,500,785
1882.....	102,137,403	119,419,500	21,708,837
Total.....	\$1,201,454,503	\$1,484,332,401	\$199,736,608

Financial authorities in the Dominion differ respecting the bearing upon the general prosperity of the continued large adverse balance of trade. On one point, however, they are agreed, and that is in an expression of satisfaction upon finding a surplus in the public Treasury of \$6,300,000 at the end of the last fiscal year, the receipts having been, in round numbers, \$33,300,000 and the expenditures \$27,000,000. Moreover, notwithstanding a temporary dullness in trade and some stringency in money, it is generally admitted that in comparison with former years, under a different financial policy, the manufacturing industries are prosperous, wages are more liberal and better prices are realized for goods. The statistics presented by the Factory Commission of Ontario, in the report giving the results of their investigations, sustain this view. The circumstance is used as an argument that a favorable time has arrived for a revision of the tariff.

"The Iron Age" and Mr. A. S. Hewitt.

The *Engineering and Mining Journal* of March 10 contains the following communicated editorial, written by Dr. R. W. Raymond—a note at the head of the paper explaining that for all articles "signed thus *" that gentleman is responsible. We congratulate his associates in the management of the *Journal* on the fact that Doctor Raymond has relieved them from any share of the responsibility in this instance:

An anonymous correspondent of *The Iron Age* attacked Hon. A. S. Hewitt in the following words (February 15th):

"As usual, Mr. Hewitt attempts to mislead the public as to his interests in the iron trade, by pretending to be principally engaged in mining iron ore and making pig iron, whereas these operations are secondary to his main business of rolling iron and steel and drawing wire at Trenton, N. J. He probably consumes five times as much crude metal as he makes in his blast furnaces in New Jersey."

To this Messrs. Cooper, Hewitt & Co. replied, in a letter published in *The Iron Age* of February 15th:

"As a matter of fact, when our furnaces are in blast, as they usually are, we make nearly twice as much pig iron as we consume of pig and scrap together in our works at Trenton, N. J."

In *The Iron Age* of March 1st the anonymous assailant returns to the charge with a pretended statement of the grounds for his assertion, and a deliberate accusation that Messrs. Cooper, Hewitt & Co. are making false representations about their business. The course of *The Iron Age* in permitting such an outrage upon reputable manufacturers, and repeatedly publishing the slanders of a nameless coward, without taking any pains to inform itself, as it could easily have done, as to the facts, is unworthy of its reputation for fairness, and seems all the more surprising in view of the remark of Messrs. Cooper, Hewitt & Co. in their letter of February 15th to the Editor:

"We cannot conceive any justification for the admission to your columns of a communication which charges deliberate misrepresentation on our Mr. Hewitt, when by application to this office you could have ascertained the facts, so that the correction might have appeared with the charge."

The immediate reply of *The Iron Age* to this dignified rebuke is the publication of the same slander in aggravated form. We can only explain this by supposing that somebody did it while the gentlemanly Editor was absent at Boston, delivering a good-natured satire upon mining engineers, metallurgists and chemists, in which we do not remember the following stanzas:

If I am an Editor, 'twill be my pride,
To bring out the truth from the opposite side,
To let my paper some person abuse,
Then letting the victim reply, if he choose—
Which doubles the "copy," and gives all the news.

Said I to myself, said I,
First letting my paper some person abuse,
Then letting the victim reply, if he choose—
Which doubles the "copy," and gives all the news.

Said I to myself, said I,
But if the witty poet of the Boston banquet said nothing of this kind to himself, it is a pity that, by an unfortunate oversight, it should become possible for others to say it to him.

As to the last question of fact raised by the anonymous protégé of *The Iron Age*, it is sufficient to say that it is the meaneast variety of a misrepresentation, because it rests upon the quibble that at the principal pig-iron works of Cooper, Hewitt & Co., though part of the property is in New Jersey and part of the work is done in New Jersey, the blast furnace itself is a few hundred feet over the line, and in Pennsylvania. As this furnace supplies pig iron to the works at Trenton, its existence and capacity are of course essential

elements in the real question, whether Cooper, Hewitt & Co. "consume five times as much crude metal as they produce," or not. By ignoring it altogether and misrepresenting other facts, the foundation is laid on which a respectable journal permits Messrs. Cooper, Hewitt & Co. to be accused of lying, for the purpose of securing on false pretenses the passage of laws which would benefit their business.

The unknown sharpshooter who thus fires from behind *The Iron Age* assumes the capacity of the New Jersey furnaces at 30,000 tons and their product at 10,000. The Durham furnace, which he excludes (though the catalogue of the American Iron and Steel Association, his pretended authority, mentions it in two places in its New Jersey list), produced in 1882, in about 10 months of running, 27,264 net tons of pig iron, or at the rate of, say, 32,717 net tons per annum. The product of the last six months of 1882 was 16,454 net tons, or at the rate of 32,908 tons per annum. It is now producing at even a larger rate. These figures, by the way, are probably the best that have been attained in continuous running through long periods by an anthracite furnace with iron hot-blast stoves. They reflect much credit on Mr. B. F. Ackenthal, Jr., the manager of the Durham Iron Works, and we presume *The Iron Age* will be glad to publish them as a matter of news, whatever it may feel bound or not bound to do as a matter of justice.

The tariff struggle being over for a time, and the advocates of higher duties on iron ore having succeeded in getting a small increase, the necessity for employing arguments of political economy, personal attacks upon character and motive, has probably passed away, and after the publication of *The Iron Age*'s apology the "incident," as the French say, will be concluded.

We should be quite content to reprint this article without answer had the *Engineering and Mining Journal* reprinted the statements of *The Iron Age* which it claims to refute. No one knows better than the clever skir-misher who skillfully dodges every essential question in dispute, how much safer it is to pick out a sentence here and there and dance around it than to answer an article in its entirety. However, we do not expect fairness in the *Engineering and Mining Journal*, having never had it in the past.

The facts are briefly as follows: In our issue of February 8 we printed without comment Mr. Hewitt's letter to Mr. S. S. Cox, and which was read by that gentleman in the House. We did this, not because we thought the letter had any value, or was likely to have a feather's weight in influencing the action of Congress, but because we thought that, as Mr. Hewitt had spoken as a Member of Congress on a subject of public interest, and especially of interest to our readers, he was entitled to be heard in his own words. In our next issue we printed a letter from a disgusted reader, who is prominently identified with iron mining in New Jersey, in which some of Mr. Hewitt's statements in his letter to Mr. Cox and before the Tariff Commission were shown to be misleading. Among other things it showed the impropriety of Mr. Hewitt's statement that his firm were the largest producers of ore and pig iron in New Jersey. Mr. Hewitt did not say this in so many words in his letter to Mr. Cox, but he did make the claim specifically in a letter printed in the *Engineering and Mining Journal* of January 7, 1882. Our correspondent's letter was a perfectly proper one—the writer was personally known to us, and we were fully prepared to accept his statements and to publish them then, as now, considering them true. In our issue of February 22 appeared the following, published without comment:

NEW YORK, Feb. 13, 1883.

To the Editor of *The Iron Age*: We cannot conceive any justification for the admission to your columns of a communication which charges deliberate misrepresentation on our Mr. Hewitt, when by application to our office you could have ascertained the facts, so that the correction might have appeared with the charge. This writer of the communication entitled "The Duty on Iron Ore," in your last number, says that he (Mr. Hewitt) probably consumes five times as much crude metal as he makes in his blast furnaces in New Jersey. As a matter of fact, when our furnaces are in blast, as they usually are, we make nearly twice as much pig iron as we consume of pig and scrap together in our works at Trenton, N. J. If the defenders of unnecessary duties upon iron ore and scrap iron have no better weapons to rely upon than such deliberate falsehoods as your correspondent has uttered, they had better submit gracefully to the inevitable removal of all obstructions to the production of cheap iron, which is indispensable for the continued progress of the country. Yours, &c., COOPER, HEWITT & CO.

The reason for the appearance of this letter without editorial remarks was because it was the only one of the series received while the editor was absent from home, attending the Boston meeting of the Mining Engineers. Now, concerning this letter we have to say that if it was intended to convey the impression that, when in blast, the New Jersey furnaces of Cooper, Hewitt & Co. make nearly twice as much pig iron as they consume of pig and scrap together in their works at Trenton, we do not hesitate to say that we do not believe it. It is simply an evasion of the statement that Mr. Hewitt had misrepresented the magnitude of his interests as an ore miner and iron producer in New Jersey. In our next issue—that of March 1—our correspondent shows that the letter of Cooper, Hewitt & Co. was simply a specious evasion of the charge that Mr. Hewitt had indulged in some extravagant boasting, and concludes his letter as follows:

The bandying of epithets is a poor method of discussion, but Mr. Hewitt seems to act on the principle of abusing his opponents where he has the worst of the argument. In order to give him an opportunity to clear up the ore and scrap question, there are stated herewith six distinct mis-statements, untruths—or, in his own way of expression, falsehoods—made by him on various occasions.

No. 1. That his firm are the largest miners of iron ore in New Jersey. (See letter in *Engineering and Mining Journal*, January 7, 1882.)

No. 2. That every ton of foreign ore brought here enables a ton of ore to be used which would otherwise find no market. (See letter as before.)

No. 3. That in New Jersey and Pennsylvania

there is not a pound of ore that is not put on the cars for less money than the freight from Africa and Spain to New York. (See Tariff Com. Report, p. 1084, line 10, &c.)

No. 4. That the freight of foreign ore averages from 15¢ to 20¢. (See Tariff Com. Report, p. 1086, line 8, &c.)

No. 5. That no foreign ore is sold here at less than \$6 per ton. (See letter to S. S. Cox.)

No. 6. That cheap scrap iron and pig iron are friends, and not enemies. (See letter to S. S. Cox.)

The only answer to this invitation to Mr. Hewitt to vindicate his reputation for veracity in statements obviously intended for political effect appears in the shape of the article in the *Engineering and Mining Journal* quoted above. Now, to lift the responsibility from the shoulders of the "anonymous correspondent" and put it squarely where it belongs, we will say what we think of the statements of Mr. Hewitt quoted above.

No. 1. We do not believe that Cooper, Hewitt & Co. are the largest miners of iron ore in New Jersey. Their importance in this branch of business is inferior to that of the Glendon Iron Co., the Thomas Iron Co., the Mount Hope Mining Co., the Musconetcong Iron Works and the Andover Iron Co., each of which produce more ore than is raised from the New Jersey mines of Cooper, Hewitt & Co. We make this statement on the best information we can gather, and believe it to be true, notwithstanding Mr. Hewitt's letter, from which we quote as follows:

I shall, therefore, do all in my power, although my firm is the largest miner of iron ore in New Jersey, to secure the total abolition of the duty, and not its increase.

No. 2. Dr. Raymond, in his answer to Mr. J. Wesley Pullman, printed in the *Engineering and Mining Journal* of November 18, 1882, publicly withdraws this absurd claim, saying: "It is a statement which we have never repeated and do not now defend." Perhaps it is more generous to let Mr. Hewitt have credit for whatever participation in this disclaimer the "we" may imply.

No. 3. This statement is notoriously untrue, and probably it would be safe to say that Mr. Hewitt is 50 per cent. out of the way.

No. 4. This statement is not warranted by facts, as Mr. Hewitt was himself forced to admit when questioned by Commissioner Oliver.

No. 5. Purchasers of foreign ores know that on this subject Mr. Hewitt, who buys no foreign ore, is mistaken.

No. 6. We are willing to admit that on this subject Mr. Hewitt's utterances may reflect his convictions. If so, there is very little room for dispute as to the measure of his intelligence.

As to the article from the *Engineering and Mining Journal*, it calls for no reply. What it says about the Durham Furnace is not to the point; especially as the two references to that furnace which are made in the New Jersey blast furnace list in Mr. Swank's directory distinctly specify that it is in the Lehigh Valley, Pennsylvania. As to its weak and unpleasant personalities, we feel that they do the author no credit, and are unworthy of one who is usually bright and clever, at least. But since Dr. Raymond has lugged in by the ears a verse to be added to some nonsense rhymes printed in the last issue of the *Engineering and Mining Journal*, we cannot resist the temptation to add still another:

If I to a great man should stand very near,
(Said I to myself, said I.)
I'll not as his watchdog aspire to appear,
(Said I to myself, said I.)
If by partisan zeal into mischief he's led,
And the facts do not tally with what he has said,
I'll not volunteer to be spanked in his stead,
(Said I to myself, said I.)

Scrap Iron Classification.

THE NEW YORK IRON AND METAL EXCHANGE,
334 PEARL STREET, COR. BURLING BLVD.,
NEW YORK, March 12, 1883.

To the Editor of *The Iron Age*:—DEAR SIR: The committee of this Exchange on old iron and steel having had suggested to them no material modifications of their classification of scrap iron, it has been adopted by the board of managers as below, substantially as first reported. Most of the suggestions received were in the nature of individual requirements, which, of course, cannot be met in a general specification, and do not need to be, inasmuch as individuals can always make special contracts on any specific lots after inspection.

The object of an Exchange classification is mainly to induce gradually some uniformity in the selection of scrap for shipment, and to give some standard to which appeal can be made in case of disputes over deliveries on contracts made—as is often the case—for No. 1, No. 2 or No. 3 iron. Some of the suggestions made to the committee were already covered by the wording of the specification, as on the exception taken to edge tools, which are excluded even from No. 3 grade as "steel or other foreign substances," or to turnings, which would not pass as No. 1 if less than ¼ inch thick, and if over that, are not generally deemed objectionable.

The very carefully-drawn specification furnished to your issue of March 8 by "New England," was published after action had been taken by the board, but will doubtless be considered in any classification of scrap steel that may be made, or any future revision of our classification of scrap iron, in case this should not be found to work satisfactorily. Following I give the classification as adopted.

Yours respectfully,
EDWARD J. SHRIVER, Secretary.

NEW YORK IRON AND METAL EXCHANGE CLASSIFICATION.

No. 1. Wrought Scrap Iron—Shall consist of all wrought iron other than plates (except when cut apart and free from angles and rivets), to be ¼ inch thick or upward, round and square, but not of such unusual size or shape as cannot be worked by ordinary

methods. It must be free from rails, rail ends, nails, anvils, hoes, shovels, gas-pipe, flues, stove-pipe, sheet iron, hoops, wire and similar light iron, cast, malleable, galvanized, tinned or coppered iron, zinc, steel or other foreign substances; also from burnt iron or iron excessively damaged by rust.

No. 2. Wrought Scrap Iron—Shall consist of unwieldy pieces, such as large anchors, ship's knees, armor-plates, heavy cranks, heavy shaftings, I beams, tees, angles or other iron of such unusual size as cannot be worked by ordinary methods.

No. 3. Wrought Scrap Iron—Shall consist of wrought iron unfit to grade as No. 1 or No. 2, but must be free from anvils, rails, rail ends, cast, malleable, galvanized, tinned or coppered iron, zinc, steel or other foreign substances.

The Holley Memorial Fund.

Mr. Chas. Macdonald, treasurer of the Holley Memorial Fund, reports the following subscriptions and collections to March 13, 1883:

LIST OF SUBSCRIBERS TO THE "HOLLEY MEMORIAL FUND."

L. G. Laurean.....	\$25.00
Ignatius Hahn.....	10.00
Willis U. Masters.....	25.00
Clark Fisher.....	100.00
Willard Warner.....	10.00
Erastus Corning.....	500.00
Chas. E. Emery.....	50.00
Thos. F. Rowland.....	100.00
M. J. Becker.....	10.00
Henry Janin.....	50.00
Louis Janin.....	50.00
Albert Fink.....	100.00
W. Howard White.....	5.00
Walter Katte.....	25.00
Cash.....	50.00
A. H. Emery.....	100.00
W. R. Eckert.....	25.00
R. Forsyth.....	100.00
T. R. Almond.....	10.00
H. H. Goringe.....	25.00
J. J. Hagerman.....	100.00
A. S. Hewitt.....	100.00
Edward Cooper.....	100.00
R. W. Raymond.....	100.00
Charles Macdonald.....	100.00
C. A. Martine.....	50.00
Carnegie Bros. & Co.....	1,000.00
A. Cosgriff.....	5.00
S. T. Wellman.....	200.00
W. R. Jones.....	500.00
William White.....	25.00
John Rinard.....	25.00
Thomas Lapsley.....	25.00
Julian Kennedy.....	25.00
C. C. Teeter.....	25.00
Thomas Cosgrove.....	5.00
F. L. Bridges.....	5.00
E. D. Leavitt, Jr.....	100.00
Eckley B. Coxo.....	500.00
Gram Curtis.....	25.00
Chester Griswold.....	200.00
Martin Coryell.....	30.00
R. P. Rothwell.....	50.00
J. F. Holloway.....	25.00
Dr. Persifer Frazer.....	10.00
Samuel McElroy.....	20.00
Fred. J. Slade.....	100.00
D. V. Jones.....	500.00
R. Forsyth.....	400.00
E. S. Chesbrough.....	10.00
S. Gilchrist Thomas.....	50.92
Edward L. Ford.....	50.00
G. S. Morrison.....	50.00
W. A. Perry.....	100.00
Robert W. Hunt.....	100.00
J. M. Sherrard.....	10.00
H. C. Shaw.....	10.00
S. T. Williams.....	10.00
C. T. Amberg.....	10.00
Geo. H. Otis.....	5.00
H. S. Schuyler.....	5.00
E. H. Vaughn.....	10.00
Wm. Collin.....	5.00
Noah Radcliffe.....	5.00
Reuben Willis.....	5.00
Thomas Dickson.....	10.00
M. Gardner.....	5.00
Joseph Cooley.....	5.00
Frank Finn.....	5.00
Henry Yettis.....	5.00
James Pennington.....	5.00
M. Logne.....	5.00
C. T. Vandenberg.....	5.00
C. Childs.....	5.00
J. Shaugnessey.....	5.00
John Maile.....	5.00
H. J. Ingram.....	5.00
Robert Cole.....	5.00
Jas. McCoy.....	5.00
E. Corning, Jr.....	5.00
M. Bird.....	5.00
Employees at Bessemer Steel Works and Albany and Rensselaer Iron and Steel Co.....	292.00
Jas. A. Burden.....	250.00
H. M. Howe.....	10.00
T. M. Drown.....	50.00
Cash.....	50.00
James Hemphill.....	100.00
Charles Kennedy.....	25.00
Employees Bethlehem Iron Works.....	500.00
Jos. P. Davis.....	25.00
Alfred Langsdon.....	5.00
R. Akerman.....	5.00
Henry Schneider.....	5.00
M. Kraft.....	10.00
A. Greiner.....	10.00
C. P. Sandberg.....	50.00
L. Holbrook.....	5.00
John Fritz.....	500.00
T. C. Clarke.....	50.00
J. M. Hartman.....	25.00
R. H. Thurston.....	20.00

Total.....\$8,227.92
Of this \$8,227.92 there has been
paid in.....\$4,332.92
Add interest.....11.20

Amount to be paid in.....3,895.00

Total.....\$8,239.12

The required amount is so nearly made up that there now remains no room for doubt as to the collection of enough money

BUFFALO PORTABLE FORGES AND HAND BLOWERS.



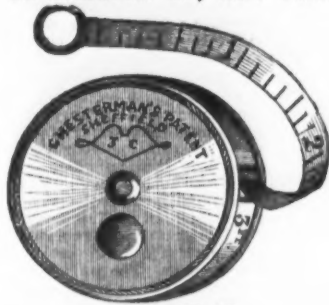
Warranted Superior to any other make, and
Guaranteed to give Perfect
Satisfaction.

For sale by all the leading
Iron, Hardware and Machinery
Dealers throughout the country.

BUFFALO FORGE COMPANY,
BUFFALO, N. Y.

Send for Complete Catalogue.

FRASSE & CO.,
62 Chatham St., New York.



IMPORTERS OF
CHESTERMAN'S TAPES, RULES, &c.,
Stub's Files, Tools and Steel Wire,
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JAMES McNEIL & BRO.,
MANUFACTURERS OF
BOILERS, SHEET IRON, ROLLING MILL
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Of all kinds.
Vertical Boilers and Engines a Special-
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29th Street and
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PITTSBURGH
Specification
for Boilers
furnished
free of charge

LIVINGSTON HORSE NAIL CO.,

95 Reade and 113 Chambers Sts., NEW YORK.

AGENTS FOR

GLOBE, EUREKA, BAY STATE

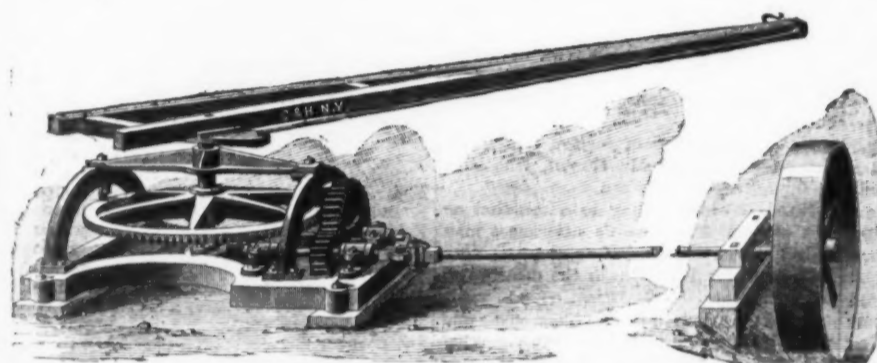
PUTNAM, ESSEX, EMPIRE,

VULCAN, CHAMPION, WESTERN

HORSE NAILS.

NEW LISTS AND DISCOUNTS FURNISHED ON APPLICATION.

NEW IRON HORSE-POWER



This is an entirely new and original pattern from designs of our own. It is constructed of iron throughout, except the levers, and is recommended for all kinds of work requiring one horse power, as, for instance, the driving of corn shellers, corn mills, grindstones, fanning mills, small cotton gins, feed cutters, grating machines, pumps, &c.

The upper works are firmly bolted to a solid iron bed plate, which, in turn, is constructed to bolt to timber foundation in the earth or to a floor. This arrangement insures perfect rigidity of all its parts, and a fixed relation between the gears and shafts, which is so necessary to avoid friction. These powers are provided with two sizes of gearing upon the internal shafts; hence the line shaft may be driven at

the usual gait of a horse, either 37 or 74 revolutions per minute. The pulley is 30 inches diameter by 4 inches face, but, in case of necessity, to communicate a given speed, we will change it as may be required.

PRICE, \$50.

Liberal Discounts to the Trade.

MANUFACTURED ONLY BY

CARR & HOBSON, Limited,

Factory, BERGEN POINT, N. J.

47 CLIFF ST., NEW YORK.

TRENTON LOCK & HARDWARE CO.
WORKS
AND
PRINCIPAL OFFICE:
TRENTON, N. J.
AGENCIES AND DEPOTS:
JAMES M. VANCE & CO.
211 Market St., Philadelphia.
JAMES MARSHALL,
48 Warren St., N. Y.

MANUFACTURERS OF LOCKS AND HARDWARE.

CHAMPION ONE-MAN SAW



WITH PATENT ADJUSTABLE ATTACHMENT. The only Saw that can be adjusted for either a One-Man or a Two-Man Saw. We make the following lengths, 3½, 4, 4½, 5 feet. Send for sample.

WHEELER, MADDEN & CLEMSON MFG. CO., Middletown, N. Y.

THE SWIFT MILL.

ESTABLISHED 1845.

The annexed cut shows one of the many styles of Coffee Mills of our manufacture, especially adapted to Grocers' use at all retailers of coffee. They are highly ornamental, and workmanship of the very best. We make more than 30 styles.

ALSO LANE'S PORTABLE COFFEE ROASTER
Will roast 30 to 40 lbs. at once and can be used as a stove at other times. Send for descriptive list to Manufacturers.

LANE BROS., Poughkeepsie, N. Y.
Also sold by leading wholesale houses.
Our agents, Graham & Haines, 113 Chambers St., New York, carry a full line of our goods, and will be pleased to serve you at factory prices.

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WOOD & WROUGHT IRON SHELLS.

PENFIELD BLOCK CO., Lockport, N. Y.

H. B. NEWHALL CO., 105 Chambers St., S. H. & E. Y. MOORE, 163 & 165 Lake St.,
New York Agents. Chic go Agents.

WIRE CLOTH, WIRE COUNTER RAILINGS,
WIRE SIGNS,
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NATIONAL WIRE AND IRON CO., Detroit, Mich.
Casting Brushes,
Sand and Coal Screens,
WEATHER VANES AND STABLE FIXTURES.
Send for Catalogue. Mention this Paper.

GALLOWAY BOILER

IMPROVED UNDER PATENTS OF 1875 AND 1876.

Safety, Economy in Fuel, Low Cost of Maintenance, Dry Steam without Superheating, Large Reserve Power ARE THE ADVANTAGES OFFERED BY THIS BOILER IN A PRE-EMINENT DEGREE.

3000 Horse-Power in Progress and for Immediate Delivery. Correspondence Solicited.

EDGE MOOR IRON COMPANY,

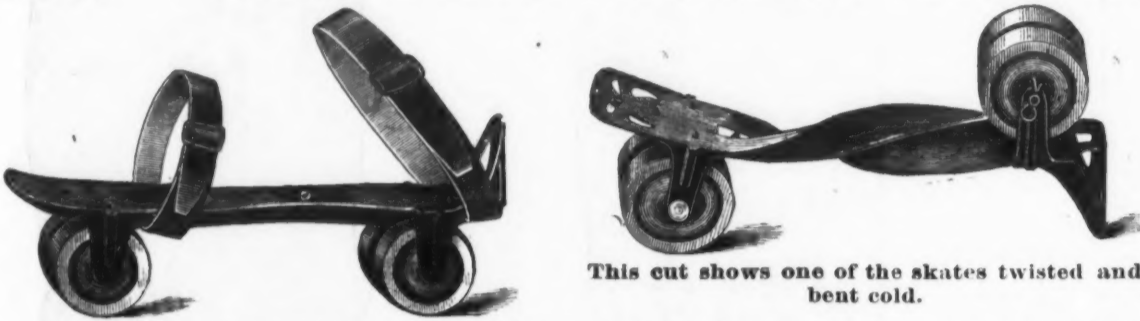
SOLE LICENSEE AND MANUFACTURER FOR THE UNITED STATES,

POST OFFICE, WILMINGTON, DELAWARE.

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WM. SELLERS, Pres. JNO. SELLERS, Jr., Vice-Pres. ELI GARRETT, Sec. and Treas. GEO. H. SELLERS, Gen. Supt.

NEW YORK CLUB ROLLER SKATES.



The lightest, easiest working and most durable Roller Skate ever made. The frames are made from a fine quality of decarbonized steel, and cannot possibly be broken in using. The heel support is preferable to the ordinary one of leather, as it cannot wear through. Besides these, the skate has many other advantages, and the price is low as compared with others. Patented June 21, 1881.

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W. A. SUTTON,

522, 524, 526, 528 and 530 West 20th Street, - - - NEW YORK.

Post's Waterproof Belt Oil and Leather Preservative, FOR WET OR DRY LEATHER BELTING.

Leather dressed with this oil will not crack or rot, as heat, cold, water or gas has no effect on it. It will spread one-third further and last much longer than any oil for the same purpose. It never turns rancid; will keep in any climate.

Belts may be run in water at one end, and a hot room at the other, and still be soft, dry and pliable. Warranted not to start glue lumps or gum on belts or pulleys, and to keep the surface perfectly smooth.



Registered in the U. S. and Great Britain.

E. L. POST & CO., No. 10 Peck Slip, N. Y., SOLE MANUFACTURERS.

AGENCIES IN THE UNITED STATES:

J. B. Hort & Co., New York. J. & H. Phillips, Pittsburgh, Pa. J. B. Farnum, Woonsocket, R. I. J. D. Barr, Buffalo, N. Y. E. B. Preston & Co., Minneapolis, Minn. Post & Co., Cincinnati, O. I. B. Williams & Sons, Dover, N. H. J. B. Hoyt & Co., Chicago, Ill. Langlois & Son, Racine, Wis. Laurence & Herkner, New York.

J. Le Roy Pine, Troy, N. Y. Jas. H. B. Livingston & Co., Phila., Pa. Brown Bros. & Co., Providence, R. I. Davenport, Johnson & Co., At lanta, Ga. Sanford & Coval, Fall River, Mass. J. Ashton & Son, Trenton, N. J. Geo. A. Smith, Richmond, Va. W. H. Dillingham & Co., Louisville, Ky.

E. B. Preston & Co., Chicago, Ill. C. E. James, Chattanooga, Tenn. C. B. Choate, East Saginaw, Mich. Camron & Barkley, Charleston, S. C. Towner, Landstreet & Co., Baltimore, Md. E. G. Studley & Co., Grand Rapids, Mich. Mantle & Cowan, Louisville, Ky. E. F. Bradford & Co., Cincinnati, Ohio.

SCOTLAND: Robert Balderston, Glasgow.

LOWE'S METALLIC PAINT CO., CHATTANOOGA, TENN.

OFFER TO CONSUMERS

THE BEST METALLIC PAINT MANUFACTURED IN THE UNITED STATES



We have OVER 1000 CERTIFICATES from Railroad Officers, Wagon and Agricultural Implement Makers, Car Builders, Tin and Sheet Iron Roofers, Wrought Iron Bridge Companies and Blast Furnaces. We guarantee IT TAKES 25 PER CENT. LESS OIL, has more body and better covering properties than any other metallic paint. For sale by the principal paint dealers and hardware merchants in the United States.



THE CLEVELAND WROUGHT IRON FENCE. Also, Castings, Finales and Vases, Stable Fixtures, Hitching Posts, Door and Window Guards, Wrought Iron Gratings, Fire Escapes and Ladders, Jails, &c. Our Fencing can be shipped to any part of the United States, and can be set up by the purchaser at small expense. Our prices are reasonable. Correspondence and notice of public lettings of ironwork solicited. Every Hardware Dealer should have our CLEVELAND WROUGHT IRON FENCE WORKS. Office, 51 Water Street, near Union Depot, CLEVELAND, OHIO.

Opinions Concerning the Influence of the New Tariff.

The following brief statement of the views of representative men in certain important lines of manufacturing respecting the probable effect of the new tariff on the interests they represent will be found instructive:

BESSEMER AND OPEN-HEARTH STEEL.

Hon. Daniel J. Morrell, of the Cambria Iron Co., Johnstown, Pa., president of the American Iron and Steel Association, says:

"The immediate effects of the change in the tariff have been largely discounted, and the final passage of the bill and adjournment of Congress will very likely bring temporary relief to business generally. The changes made in the metal schedule must ultimately prove disastrous to several of these industries. Works that are not exceptionally favored by location or the possession of extraordinary advantages as to cheap material, &c., will be closed and the capital invested in them will be lost. The rate established on steel rails must shut out from all American mills the markets of the South Atlantic States and all the Pacific States and Territories. Manufacturers of steel and iron asked only for such protection as would be equivalent to the difference between the cost of labor here and abroad, and the Tariff Commission, I believe, conscientiously sought to arrange the schedules reported by them upon the principle of giving protection in exact ratio to the labor expended in advancing crude materials to finished products. The Commission also sought to reduce rates to the lowest possible limit of safety, and aimed to protect manufacturers from the ruinous effects of evasions of fixed duties by false valuations, &c., but Congress saw fit to destroy the symmetry of the Commission's work and to remove all safeguards it had provided against fraud, the schedules as adopted being obscure, contradictory and difficult of interpretation. The flagrant Treasury decisions, by which the revenue was robbed and our manufacturers injured, have been legalized, and opportunities for fraud have been increased a hundred-fold.

"The rates on Bessemer and open-hearth steel ingots, blooms, billets, &c., and on wire rods, hoop iron and cotton ties, are such as must keep these industries, if maintained at all, in a condition of peril for the owners and poverty for the operatives. No pretended interests of consumers can justify such legislation, for no interest will be served by it, and it bears the ineffaceable stamp of ignorance and malice. No manufacturing industry has done so much to develop the wealth and resources of the country as that which is now attacked. It has reduced the cost of steel rails to the railroad companies to one-fourth what it was when the Bessemer works were first started here; it has saved to the nation hundreds of millions of dollars in money that would have gone abroad if the railroads could have been built without its aid. And now the manufacture of rails is checked and the further utilization of steel in place of iron is prohibited, unless conditions to which no other industry is subjected can be borne by the capital and labor employed in this business. Consumers of steel rails have not asked for such a great reduction in the duty, and, so far as I know, not a single railroad manager of any repute has wished for a tariff rate lower than the manufacturers themselves were willing to accept.

"To state clearly the far-reaching effects of this legislation, as business men must apprehend and fear them, would take more time than I have to spare, and more space in your paper than you would be willing to give. Stupidity reigned throughout the discussion at Washington, and it still characterizes the criticisms of the measure in the newspapers. The country will learn by experience how to value the wisdom of its legislators who propose to reduce the revenue by increasing the imports, to cheapen commodities by destroying home competition in their production, to benefit consumers by depriving them of the principal market for their own products, and to render one industry prosperous by obliterating another."

Views of Pittsburgh Merchants.

At Pittsburgh the iron and steel manufacturers were not much inclined to discuss the effect of the tariff on their particular business, chiefly for the reason that, owing to the many changes in classification, it was rather difficult to arrive at any decided views as to what its effect would be on particular lines of business. The general expression, however, not only of those whose views are given below, but of those who refused to state over their own names their opinion, was to the effect that the bill would be injurious to quite a number of interests, more especially to the steel interest and to the pig-iron industry, by reason of the large importations of scrap and finished articles that would result from the lower duties. The following statements, however, give in general the views of the best informed manufacturers of Pittsburgh:

FIG IRON.

Mr. A. H. Childs, a broker of pig iron, representing several Fayette County furnaces, is of the opinion that the effect on the direct importations of pig iron will be very slight, the reduction, which is 28 cents a ton, being no more of a change than may come any day in the ordinary course of business, but so far as the reduction in rates affects the general iron trade by decreasing the production of the country, in so far as it will be injurious also to the pig-iron trade by decreasing the demand for pig iron. The heavy reduction on scrap iron of \$1.28 will also have its effect in encouraging importation of scrap iron, and consequently decreasing the demand to that extent for American-made pig iron.

Nimick & Co., who represent a large number of furnaces in various parts of the West, are also of the opinion that the reduction of duty on pig iron is so slight that it will have but very little effect on the importations of pig iron itself, but the importation of scrap iron will probably be largely increased, which cannot but affect the demand for American pig iron. They are also of the

opinion that the furnaces will be injuriously affected by the lower prices that the manufacturers of other iron, on which the duties have been reduced, will demand in order to compensate for the reduced prices at which they must sell their goods by reason of the lower tariff. In the reduction of cost of production that must come, pig, labor and everything else must suffer.

HOOP IRON.

J. Painter & Sons, who are the largest manufacturers of hoop iron in the country, stated that it was too soon after the passage of the bill to make any change that may occur manifest. Its effect on cotton ties would, of course, be to prevent the manufacture of any in this country, but these have not been made here to any extent for three years and a half, so that, so far as cotton ties are concerned, the effect of the bill is to destroy a hope or a possibility that the 35,000 tons needed to bale the cotton crop of the country would be made here. Of course, if the rate of duty had been such that these ties could have been made here, it would to that extent have given the cotton-tie mills orders and reduced the competition for orders for other grades of hoop iron. The new classification of hoop iron will require very close working on some sizes to retain the trade in this country. Such sizes as 1/2 inch x No. 20 and 3/4 x No. 19—in fact, the whole of the second classification between No. 10 and No. 20, with the new rates, bears very heavily on the hoop-iron manufacturers, and between these sizes is included a great deal of hoop. They believe it probable, however, that the provision levying 1/4 cent per pound duty extra on all manufactures of hoop iron would be in a degree beneficial.

GENERAL MERCHANT IRON.

Mr. B. F. Jones, of Jones & Laughlin's, believed that the general condition of the country was so good that the tariff, though decidedly wrong in many of its provisions, will not have a disastrous effect at the present time, though it will compel lower prices on many forms of iron and steel than would have ruled under the old tariff. At the same time, however, it will have a beneficial effect in preventing the extension of old works and the building of new, and will also lead those who have money to loan to be more conservative in their dealings.

SHEET IRON.

Mr. P. H. Laufman stated that the new tariff is decidedly injurious to the sheet-iron industries. It has not only largely reduced the duty on sheet iron No. 20 and less, averaging from \$5 to \$7 a ton reduction, but, by continuing the rate of 30 per cent. on taggers iron, it has destroyed all prospect of making any of that iron in this country. The result will be that there must be a readjustment of prices in order to meet the prospective competition from England. The sheet men have already discounted this to a large extent, but there must still be a readjustment that will require lower profits, lower materials and lower wages.

STEEL.

Mr. Jas. Park, Jr., of the firm of Park, Bro. & Co., who has watched the course of legislation at Washington very closely this winter, is of the opinion that the new tariff bill is very confusing, that it will be very difficult of application to importations, and will result in bringing more cases of appeal before the Treasury Department than were ever known under the old law. Its effect on crucible steel he stated to be very bad, because of the classification adopted and the ad valorem rate of 45 per cent. levied on all steel valued at 4 cents a pound or less. This violates the principle that was adopted by the Tariff Commission of striking the ad valorem rates out of the tariff and adopting specific, and is also a direct bid for under-valuation. It also very materially reduces the duty on the higher grades of crucible steel, or that valued above 10 cents per pound. This reduction, Mr. Park estimates, will amount to 35 per cent. on these grades of steel. It will also bear especially hard on Bessemer and open-hearth steel, perhaps more so on these than on any other form of iron or steel. Billets and blooms for boiler plates and other articles that have heretofore paid 2 1/2 cents duty will now pay only 45 per cent. and the same is true of all merchant articles made from open-hearth and Bessemer steels, such as rounds and squares and sheels and rods; these have paid 2 1/2 cents heretofore and will now pay but 45 per cent. ad valorem, with all the inducement to fraud that an ad valorem rate brings with it.

Views of Philadelphia Merchants.

Messrs. Wm. & Harvey Rowland, manufacturers of springs, steel, re-rolled navy iron and nail rods, say:

"It is too soon to express an opinion about the new tariff. We think our manufacturers will get a fair share of the trade. Quite a large amount of the orders we receive one day are wanted (if not the next day) quick, and we think that where one size was ordered 30 years ago, about 100 sizes are now wanted and in smaller quantities; this is worth something to our people, notwithstanding the cable and steam."

Mr. David Reeves, president of the Phoenix Iron Co., says:

"In our opinion the tariff bill as passed is injurious to the iron and many other trades, and we are disappointed that a Republican Congress did not adopt a better one. While we would not have objected to reductions on some rational basis, we believe that the new tariff is not so framed. We look upon protection as beneficial to the whole people of this country, and consider that this principle was entirely lost sight of by the makers of the new law."

Messrs. James Rowland & Co., of the Kensington Iron, Steel and Nail Works, say: "We think that no good can come out of newspaper views on the tariff question. It is fixed that we must accept the new tariff law, whether satisfactory or not. All that can be said for or against it can have no other influence than to keep up a disquieted condition of business. We hope the newspapers will give us a rest on said question." Messrs. J. Wood & Bros., manufacturers of planished sheet iron, say: "We are under the impression that the new tariff bill will not affect the iron trade

NEW CHAMPION FORCE PUMP.

HAS Vacuum Chamber and Air Chamber, PRODUCING A CONTINUOUS FLOW OF WATER, Both in Suction and Discharge, AND THEREFORE WORKS SMOOTHER AND EASIER THAN ANY OTHER FORCE PUMP IN THE MARKET.

Has Seamless Drawn Brass Cylinders and No Stuffing Boxes.

Never Freezes in Winter, and is Not Liable to Get Out of Order.

With hose attachment it is valuable as a fire protection, and for sprinkling lawns, gardens, &c. It is light, neat, and easy to handle, and yet strong, substantial and durable, and is adapted to all kinds of wells, dug, drilled or driven. Send for descriptive circular and price list.

CLARK BROS., BELMONT, N. Y., U. S. A., SOLE MANUFACTURERS.

THE DETROIT LUBRICATOR CO.'S LUBRICATOR CUPS.

For oiling valves and cylinders of steam engines by the only perfect method, through the steam pipe. The oil passes in slight drop by drop, into the column of steam, where it vaporizes, thus becoming a steam lubricant, oiling perfectly every part reached by the steam. Any clean oil, black or white, light or heavy, may be used. Saves from 50 to 75 per cent. in oil and wear of machinery, thus paying for itself several times a year. A cup will be sent to responsible parties on 30 days' trial if desired. In ordering, give diameter of cylinder.

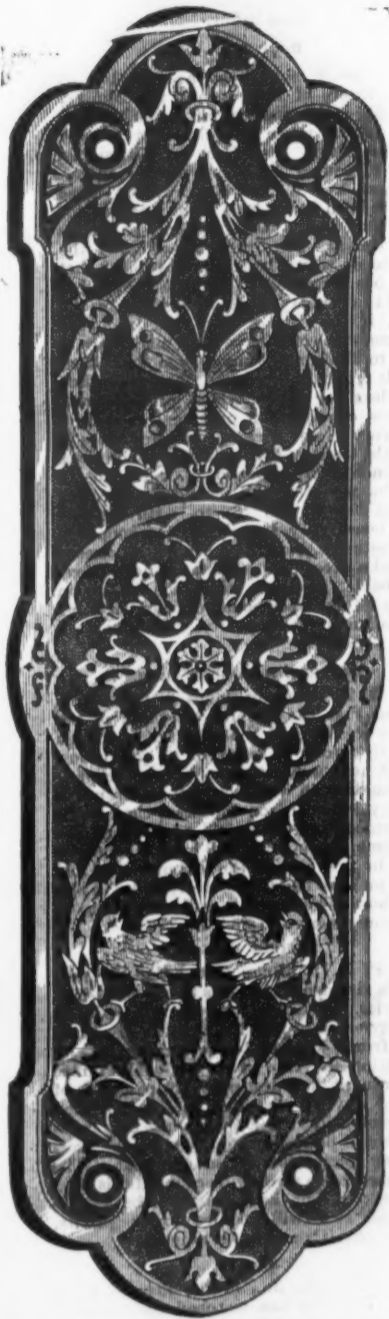
Note.—In our recent suit against the Ameri Matthews, of the U. S. Supreme Court, involving their "light feed" feature, a decree was rendered in our favor August 1, 1882. Address: Lubricator Co., of Detroit, before Justice-Stanley.

DETROIT LUBRICATOR CO. Office, 129 GRISWOLD ST., Detroit, Mich. Mention The Iron Age.

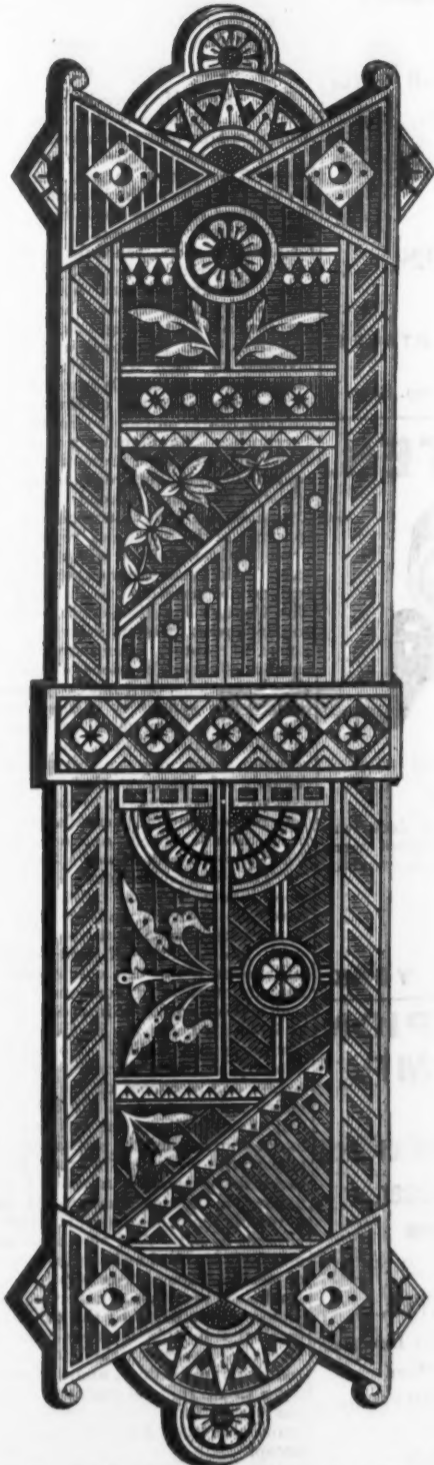
T. NEW'S PREPARED ROOFING

For steep or flat roofs. Applied by ordinary workmen at one-third the cost of tin. Circulars and samples free. T. NEW, 39 John St., New York. BARRETT, ARNOLD & KIMBALL, Western Agents, Chicago, Ill.

SARGENT'S HARDWARE



Push Plate, Nos. 422 and 822.



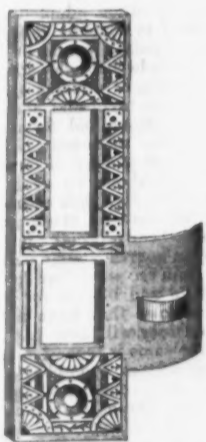
Push Plate, Nos. 823 and 829.



Door Pull, No. 597.



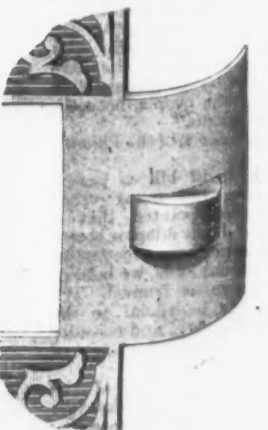
Door Pull, No. 598.



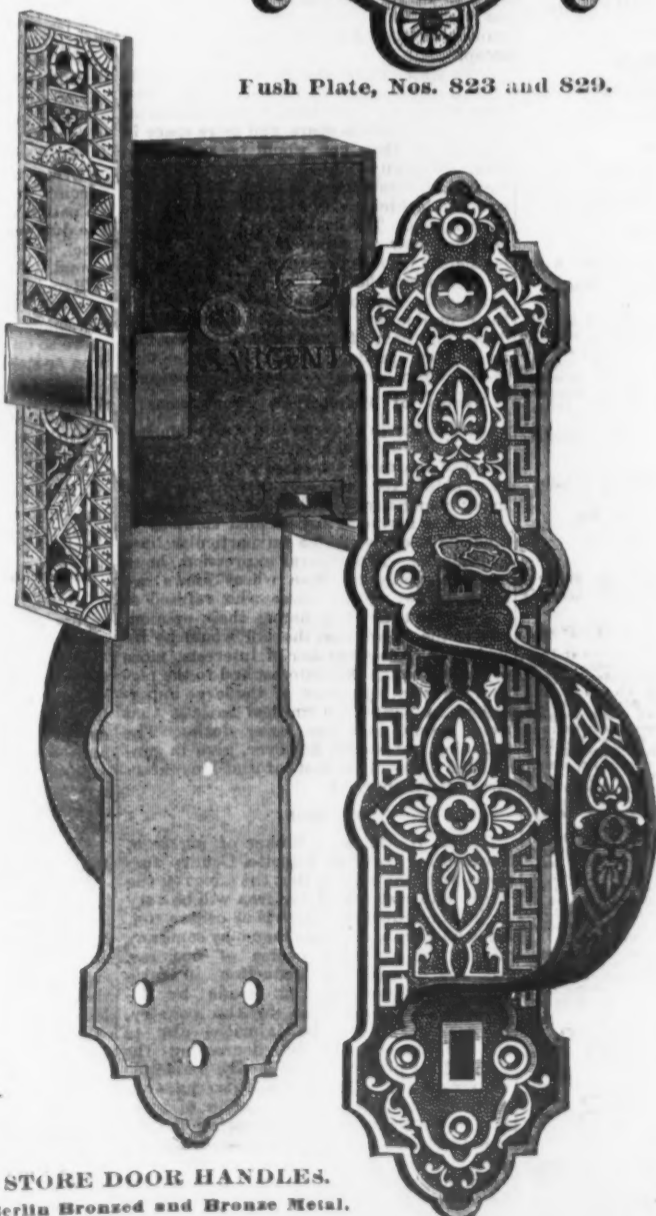
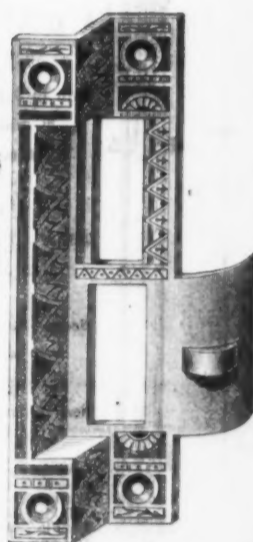
Anti-Friction Strike.



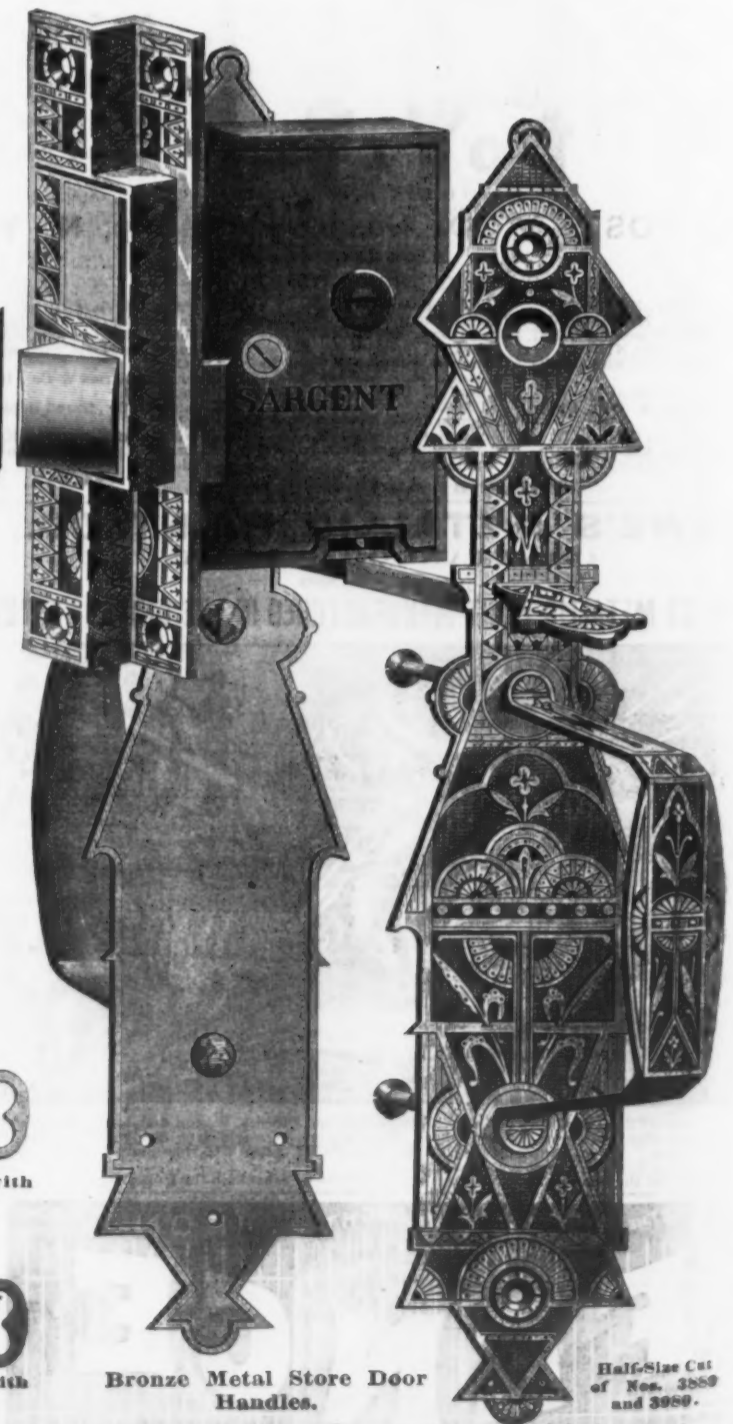
Two Flat Steel Keys.



Sectional View, Showing Full Size of Roller.

STORE DOOR HANDLES.
Berlin Bronzed and Bronze Metal.

Anti-Friction Strike.

Two Flat Steel Keys with
3-Tumbler Locks.Four Flat Steel Keys with
5-Tumbler Locks.Bronze Metal Store Door
Handles.Half-Size Cut
of Nos. 388
and 389.

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much under the present low prices. But if prices should go up to a fair living price, we think considerable iron of some descriptions would be imported. The effect of it, so far as the iron schedule is concerned, will be reduction of wages and expenses of every kind, and low prices of raw materials."

Mr. J. H. Sternbergh, of the Reading Bolt and Nut Works, says:

"In regard to the new tariff, I regard the main element of satisfaction with which iron manufacturers receive it to consist not so much in the amount of tax imposed on the various articles as in the fact that the tariff question is finally settled, and that there will probably be no further agitation on the subject for years to come. With this confidence manufacturers will at once proceed to adjust their business affairs to the conditions demanded by the new rates, however much they may think the rates unwise as affecting the prosperity of their particular line of business. The rates affecting my own branch of business are sufficient in the main to fairly protect the industry, and that is all that can be asked."

Mr. Henry Whiteley, trustee of the McDaniel & Harvey Co., manufacturers of galvanized sheet iron, says:

"We consider the metal schedule of the new tariff as likely to prove unfair and unequal in its operation, as might be expected from the manner in which it was made. There has been little or no revision, except possibly in classifications, while most of the reductions made are either on articles not justly entitled to bear them, or else have been so slight as to make no practical difference to either manufacturer or consumer. The next Congress might profitably spend some time in revising the work of the Conference Committee. Raw materials are either advanced in rates (as on ore), or unchanged (as on spelter), or only very slightly affected (as on pig iron), while finished products, except those of New England, bear the brunt of the reduction."

Mr. J. Wesley Pullman, selling agent of the Andover Iron Co., Philadelphia, says:

"The circular which our Eastern Pig Iron Association presented to the Ways and Means and Finance Committees contains my views on tariff rates required on pig and scrap iron. I fear our Eastern (Atlantic coast) furnaces will suffer material damage from the serious reduction of \$1.25 per ton on wrought scrap (say 16 per cent). As 1 ton of wrought scrap replaces about 1 1/4 tons pig iron, I consider such reduction, further, as a severe blow to one of the highest-paid classes of rolling-mill labor—the puddlers. It is true that the tariff first passed recognizes the claims of iron ore by a specific duty of 75 cents per ton, and as one who took part in the argument upon that subject before the Tariff Commission, it is gratifying at last to have the same duty secured for iron ore as upon bituminous coal. If, however, the effect of reducing the wrought-scrap duty \$1.25 per ton results, as most likely, in putting out of blast many furnaces in the Atlantic States, thereby depriving the iron-ore producers of a market for their ores, the victory will prove a barren one. The iron-ore and pig-iron interests are, or should be, common to both. The representatives of iron-ore constituencies must battle in the next Congress for a duty upon pig and scrap iron that will warrant the blowing of our Eastern stacks, or they will find the furnaces cold and the ore mines gradually closed."

Messrs. E. H. Wilson & Co., dealers in iron and railroad supplies, Philadelphia, say:

"In reference to the effect of the new tariff bill upon the iron trade we do not see any material change, nor expect any to take place for lower prices, the tendency being rather to better figures than are now ruling. We do not think the general iron business will be much affected, the parties who will suffer principally being the wire, hoop iron and some steel manufacturers, these industries having certainly been unjustly dealt with, as a rule."

Messrs. Sites & Gill, dealers and brokers in iron, Philadelphia, say:

"We think it rather early to say much regarding the effect of the tariff recently passed. Certainly its passage has given more confidence to both buyers and sellers, though prices are not improved. The small reduction on pig iron will not increase the importation. In regard to scrap, the reduction on which is much more, we think that in all cases the preference would be given to American, on account of its being better selected."

Mr. W. E. S. Baker, of the Duncannon Iron Co., says:

"We think the demand has increased for pig, and prices are obtained more easily, and if 50 cents advance is asked by all it can be obtained. This is especially true in the West, where pig has advanced 50¢ @ \$1. Pig is costing \$19 @ \$20, and there is no margin for an isolated furnace. Bars quite active in the interior, if we go down to Pittsburgh price, and sell at 2.2 cents or so—in some cases lower. Here it will be hard to sell at 2.2; as Western iron is offered at 2.15 here. Nail demand checked by the cold weather, but fairly active at about \$3.20; retail is higher and large wholesale a trifle below that—say \$3.20 @ \$3.30 retail; \$3.15 @ 3.25 wholesale—very few here below \$3.20. The new tariff will make a new schedule of bar extras necessary, but it will not be done before six months or so. It costs \$5.50 at Pittsburgh and \$6 further West for puddling. In the East the same work is done for \$3.50 @ \$4, and how the West can go on at such wages and get less than we for products is a mystery. The settlement of tariff agitation gives more confidence. Orders will come, and cost will be adjusted to suit the new regime."

Messrs. Blakey & Walbaum, brokers, Philadelphia, say:

"If the tariff question is now to be permitted to rest as decided by Congress, we believe that the trade will gradually adjust itself to the new order of things, notwithstanding the inconsistencies of the bill, though, of course, some important branches of the iron and steel trade will suffer materially. Trade has undoubtedly, during the past few months, been damaged more by the uncertainty regarding tariff legislation than it is likely to be by the effects of the present bill."

Messrs. Justice Cox, Jr., & Co., agents for iron works, Philadelphia, say:

"It will hold pig iron down, and there will be little money in the making of it, and more furnaces will be out of blast than in, unless wages come down to something like the same class of workmen are paid on the other side of the sea, and this means lower wages to all workmen in America. There are always large stocks of pig iron in Glasgow and other foreign ports, ready to ship as soon as this market will take it, and our manufacturers of bar, sheet and other manufactured irons will use foreign iron when it gets below the same class of iron in this country; hence the tariff affects pig to a much greater extent than manufactured iron. We think people will go into new enterprises very cautiously for a time, and all this means dull times to American workmen, and we all know that dull times mean low wages and little money floating. But there is little to be said, as the bill has passed Congress and will soon be a law, and we must abide by it. All we can hope for is that the business of the country will be allowed to take care of itself, and not be turned upside down by another Congress tinkering with the tariff. In fact, the greatest blessing to the country would be if Congress did not meet but once in three years."

Messrs. J. Tatnall Lea & Co., iron commission merchants, Philadelphia, say:

"We think that while the new tariff is not as strongly protective as it should be to all the iron interests, and especially pig iron, it is probably as good as could be expected, in view of the fact that there are large portions of the country in which local interests are antagonistic to protection. We see no reason to doubt that business will soon adapt itself to the new rates, and anticipate a good business for this year. Any present dullness comes from other causes, such as overproduction in some lines, and a conservative feeling in regard to new enterprises."

IRON ORE.

A gentleman prominently identified with ore mining in the East, but who modestly withholds his name, says:

"The ore producers of New Jersey regard the increase of duty on iron ore to 75 cents per ton, more as a guarantee that they shall have the opportunity of supplying their natural market with ore than as effecting an immediate increase in the price of ore. The question was whether they could maintain their standing, as compared with the advanced stages of iron and steel manufacture. They think that the action of Congress demonstrates that iron and steel makers must expect to depend principally upon native ore as a basis of manufacture hereafter. They do not expect to get any increase in price of ore, but have now sufficient certainty for a fair business in the future to warrant them in making necessary improvements for economical production. The best mines have reached a transition stage, from shallow to deep mining, and require a large expenditure and the best appliances to enable them to compete with newer and shallower mines. With competition of foreign ores, free of duty, they would not have dared to make the necessary outlay, and many good mines would have been abandoned."

"As to the effect of the reduction in duties on pig iron and steel rails, the ore men understand perfectly well that they will have to follow the market, and only get as much for their ore as the manufacturer can afford to pay, but they well know that high duties on iron and steel and low duties on ore would enable the manufacturers to pay such high wages that the ore producers could not compete with them in the labor market. The present tariff, by lowering the duty on steel rails and increasing on ore, tends to equalize the situation, though these duties are all too low, and will require a reduction in wages. Had it not been for the conduct of the Bethlehem Iron Co. and Pennsylvania Steel Co., through their representatives repudiating the action of the Cresson convention, better rates of duty might have been obtained all around. These parties, by their greed and selfishness, cast odium on the trade and made it a more salient object of attack. If they can learn by experience, better rates may be hoped for in the future."

Expressions from the Tin-Plate Trade on the Tariff Bill.

The tin-plate trade in Philadelphia expresses themselves in regard to the tariff as follows:

Mr. Nathan A. Taylor, of N. & G. Taylor Co., is of opinion that the reduction of a tenth is in the right direction, but not of sufficient importance to affect any special interest to any great extent. Mr. Taylor thinks that tens of thousands would be benefited by lower duties, without serious injury to any, although a few individuals might feel it for awhile. The use of tin plate is rapidly increasing, and Mr. Taylor thinks it will ultimately be used for a variety of purposes not thought of at present. Among these he instances an order, which was sent to one of their customers, for boxes in which to pack patent medicines for South America. Paper boxes had previously been used. The advantages are obvious, and, if prices of tin are low, it will open up avenues of trade hitherto unthought of.

Mr. C. Merchaut has scarcely had time to examine the subject very closely, but thought the reduction was so trifling that it would make very little difference to any one. Prices abroad are at the moment extremely depressed, but as plates can barely be produced at the figures they are selling for, there is no room for further decline, especially as the raw material shows already an advancing tendency. A very large number of inquiries for quotations have been made within the past three or four days, and Mr. Merchaut is of opinion that, with more reasonable weather, business will soon show a marked improvement.

Mr. A. R. Hall, of Hall & Carpenter, thinks that the change is so very trifling that it cannot have any important influence on the trade. The best feature of the case is that it is a settlement; so that people can make their arrangements on a definite basis, which they could not do so long as the subject of tariff was in doubt. This and more genial weather, which is naturally looked for at this season, Mr. Hall believes, will

lead to a decided improvement in the demand for tin plates, which for some time past has been somewhat irregular.

Mr. Dillon, of Dillon, Folwell & Co., in general terms expressed views in accordance with those previously called upon. He considers prices very weak, however, and thinks the reduction in duty, averaging about 15 cents per box, has already been discounted. Buyers do not appear to be fully satisfied, however, and it may take some time to place business on a firm footing.

Mr. Edwin Ingram, of Gummey, Sperry, Ingram & Co., thinks that the country has abundant cause for gratitude in the fact that Congress has adjourned until December, so that business cannot be interfered with by legislative action for that length of time at all events. He is also of opinion that the action of Congress was very significant, in making a reduction in direct opposition to the recommendation of the Tariff Commission. It shows how strong the feeling was against any such measure, and Mr. Ingram thinks that the trade throughout the entire country has been placed under obligation to the Philadelphia merchants for their prompt and vigorous action in pressing the matter to a successful issue in Washington. The entire country will benefit by this reduction, and that without detriment to any interests already established.

Mr. W. P. Hibberd, of W. F. Potts, Son & Co., thinks that the prompt action of the Philadelphia merchants has been the means of averting a serious disaster. An advance such as recommended by the Tariff Commission would have been a calamity to thousands of small manufacturers in every town and village in the land. No article of commerce is in more general use than tin plate, and while it does not interfere with any article of domestic manufacture, it is, in fact, in many respects the raw material of a variety of articles which without tin could hardly be made merchantable articles at all. Mr. Hibberd considers the action of Congress in this matter as in accordance with what the country was led to expect, viz., a reduction of duty. In all sections of the country are equally benefited; no single industry is injured, while many will feel it as a direct benefit.

Messrs. Lyon, Conklin & Co., Baltimore, say: "We look upon the small reduction as a step in the right direction, but we think the reduction should have been greater. We regard a duty of 1/2 cent per pound as ample, and are not sure that they should not be put on the free list. We would advocate a gradual reduction looking to that end in the near future. We would hardly like to see the entire duty taken off at once."

Stove Men on the New Tariff.

The prominent stove men, along with other large manufacturers, are being interviewed by the press on the effect of the new tariff. Col. Walter P. Warren, of the Fuller & Warren Co., is reported as saying: "I do not see what effect the bill can have on the stove trade, except as it affects the general volume of trade throughout the country. If that is increased, it will help us; if reduced, it will hurt us. There is, I understand, only 28 cents a ton reduction on pig iron, and that is not enough to make any difference with us. I think the general effect will be good. Of course, certain specialties, such as wire, will be injured, but the measure will reduce the burden of taxation, remove the bugbear of uncertainty and induce confidence."

Mr. John S. Perry, of Perry & Co., says: "The reduction on pig iron is too slight to affect prices materially. Pig iron is an article that stove manufacturers buy. On its face it would seem to be for their interest to have the tariff reduced. I, however, am in favor of a tariff that will protect home manufacture, whether it be more or less, as I believe it is for the general good of the country, and particularly for the workingmen; for if the tariff is reduced to such a point that our manufacturers cannot compete with foreign nations, clearly they will stop business or reduce the wages of employees. The country has been prosperous under the present tariff, and, while it could be improved, it is still a pretty good plan to let well enough alone. As I view the foundry business, taken in connection with the general business of the country I would greatly prefer to pay a duty of \$10 per ton on pig iron than to pay a duty of \$3, for I think a change of the duty to \$3, or anything like it, would ruin hundreds of iron manufacturers, and entail a great distress upon the workingmen, who are now receiving good wages. I do not wish to see the laboring people of this country brought down to the condition of a large portion of British workmen. The tariff is not a tax upon the people for the benefit of 'lordly manufacturers,' as they are sarcastically termed, but in my judgment is more for the benefit of their employees and for the tillers of the soil. A home market is what the latter need for their products, and they enjoy it in proportion to the extent of our domestic industries."

The Basic Process in the South.

A correspondent writing from Tennessee says:

"The one condition that will make the production of Bessemer steel in the Southern district is the application of the basic process to our metal. There is no Bessemer ore worth mentioning in the South. Small bodies are found here and there, which do pretty well, but are soon used up, or as they are worked are found to contain either too much silicon or too much phosphorus. All the West Tennessee and Middle Alabama ores carry large percentages of silicon. The gray ore found near Cartersville, Ga., makes a pig that converts into Bessemer until the mine is worked to considerable depth, when it becomes lean and is full of silicon. This is true of all the hematite deposits of East Tennessee and Southern Kentucky. The magnetites of Western North Carolina have not been tested for Bessemer purposes, though they produce a very fine crucible steel. The Roane Iron Co. have spied out the land; every hill containing a suggestion of Bessemer ore has been tested by their experts, until they are thoroughly satisfied there is not enough of this grade of ore in the South out of Virginia to justify any expenditure for its utilization. The Southern furnaces are now making as

good pig of the cold-short variety as is produced anywhere, and this interest has grown with astonishing rapidity in the years since the 'boom' set in. It is now far beyond the capacity of local mills and foundries to consume—and in the local list we include Louisville, Southern Illinois and St. Louis—and the general and increasing demand for steel has created especial interest among our ironmasters in movements looking to securing the use of the basic process."

It need surprise no one if Southern Congressmen become especial champions of the bill introduced at the last session to compel the owners of that patent to sell royalties on the same principle that rights of way are secured or other corporate privileges enforced. There is certain to be a strong pressure in favor of this proposed measure, and it will come from the representatives of the iron regions of the country, assisted probably by those especially standing for the agricultural districts."

Whether or not the principle of "condemnation" can be applied to a patent or to property in a patent we do not presume to give an opinion, but it is pretty certain that things demanded by a very great majority of the people are apt to be granted, regardless of their legality or equitableness, and the people can readily be wrought up to clamor for the general use of the basic process, regardless of the wishes of those who hold a monopoly of it."

WASHINGTON LETTER.

(From Our Own Correspondent.)

WASHINGTON, D. C., March 14, 1883.

Judging from the views expressed by officers of the Treasury Department, the carrying into effect of the new tariff act will be attended by no small amount of labor, and, doubtless, confusion. The official copy has not yet been received from the Department of State, so that the officials who will have charge of the matter in the Treasury Department are not able to state as to the particular features of the bill except in the disconnected shape of its hasty passage through the two houses of Congress. The striking out of the sections relating to the adjustment of differences as to classification and rates leaves this part of the business in the same shape that it was before the passage of the act. In some respects the bill is a simplification of the old system, as more articles are specifically rated, and out of the absence of such classification spring most of the difficulties."

THE TARIFF COMMISSION.

Unauthorized statements have been sent from here that the Tariff Commission were still drawing their pay at \$10 a day each. This is an injustice to those gentlemen. Their labors were completed when they submitted their report to Congress, and since that time they have asked no pay, nor have they received any. Mr. Hayes, the president of the Commission, is here settling up his accounts, but the work is ended. The total outlay on account of the Commission is stated at \$70,000. They certainly amassed a large amount of data bearing upon the subject, and their bill was generally accepted at first as satisfactory, although some industries complained. The presence of Mr. Oliver undoubtedly prevented an outbreak on the part of the metallurgical industries. Being a large operator himself, and with the confidence of the trade in his judgment, the result of the labors of the Commission, as expressed in the metal schedule, was looked upon as the best that could be done."

CONVICT LABOR.

A mass of information bearing upon the subject of convict labor and the injustice it occasions to the honest working people, before the adjournment of the late Congress led to the introduction of a bill by the chairman of the Senate Committee on Education and Labor, intended as the pivotal point of a series of inquiries into this subject, in connection with the strike and capital and labor branch of the same committee's investigations. The following is the text of the bill to prohibit the employment or performance of labor, by convicts or persons restrained of their liberty, upon the public works or property of the United States, or the expenditure of any moneys of the United States on account of such labor:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That no convict labor, nor labor by any person who shall for the time being be under any form of restraint of personal liberty, shall be performed upon any of the public works or property of the United States; and no money shall be paid from the Treasury to any contractor or to any person on account of labor performed by any person who is under sentence or conviction for any offense by any court, tribunal, judge, justice of the peace, commissioner or other officer of the United States, or of any Territory or State, nor shall labor by any person under duress or restraint of his liberty, either before or after conviction, be performed on the expenditure of any of the public money of the United States; and no money shall be paid by any department or public officer to any contractor or person whose claim shall be founded, wholly or in part, directly or indirectly, upon such labor."

Sec. 2. That nothing in this act shall be construed to prevent the employment of persons convicted of crime at hard labor during close confinement in any prison while under sentence for crime."

A CONSTITUTIONAL QUESTION.

There is some doubt as to the constitutional power of Congress to enact legislation on this subject which would be binding upon private citizens in any State or Territory and engaged in the supply of the ordinary demands of trade. For this reason the proposed prohibitory legislation is confined by the terms of the bill, as will be seen, to the employment or performance of labor, by convicts or persons restrained of their liberty, upon the public works or property of the United States, and any department or public officer is prohibited to pay any of the public money to any contractor or person whose claim shall be founded wholly or in part, directly or indirectly, upon such labor."

There can be no question as to the power of the Government over its own expenditures for public works, but in the case of

private individuals that is a matter to be disposed of by the States directly concerned. It is proposed, however, by the Senate Committee, to look into the matter. The result of their researches into the economic and reformatory features of the convict-labor question, and its effect upon the interests of labor in general, will in all probability form the basis of legislation, or a report which will place the matter in a more tangible shape than it is now. The members of the committee themselves refer to the subject as one of great interest and importance, and express surprise that the matter had not been taken up before."

THE LABOR INVESTIGATION.

It was the intention of the Senate Committee on Education and Labor to continue their investigation of the strikes and labor question at once, but owing to the desire of Senator George, a member of the committee, to superintend the beginning of the season's work on his plantation, it was agreed that nothing would be done until about May. It has not been positively decided whether the investigations will be carried on here or at other points, but the indications, judging from the conversation of members of the committee, are that they will visit the coal and iron-mining regions and principal manufacturing centers. The committee seem to be anxious to see for themselves how the working people in these districts live."

TARIFF BILL CONSTRUCTION.

While the fully authenticated copy of the tariff bill from the rolls of the Department of State has not been received, the copies printed by authority of Congress for the use of members have been distributed. There seems to be a new revelation in regard to some of the provisions of the new bill. The new rates of duty will go into effect July 1. Again, the act provides that on and after July 1, 1883, Section 7 of the act should be substituted for Title 33 of the Revised Statutes of the United States, as follows:

"That Sections 2907 and 2908 of the Revised Statutes of the United States and Section 14 of the act entitled An Act to Amend the Customs Revenue Laws and to Repeal Moieties, approved June 22, 1874, be and the same are hereby repealed, and hereafter none of the charges imposed by said sections or any other provisions of existing law shall be estimated in ascertaining the value of goods to be imported, nor shall the value of the usual and necessary sacks, crates, boxes or coverings of any kind be estimated as part of their value in determining the amount of duties for which they are liable; provided, that if any packages, sacks, crates, boxes or coverings of any kind shall be of any material or form designed to evade duties thereon, or designed for use otherwise than in the bona fide transportation of goods to the United States, the same shall be subject to a duty of 100 per cent. ad valorem upon the actual value of the same."

The sections referred to in Section 7—that is, 2907 and 2908 of the Revised Statutes—are not included in Title 33; therefore the Treasury officials construe their repeal to go into effect immediately. Assistant-Secretary French has prepared a circular, which will be sent to customs officers, directing them to take cognizance of the repeal of the law."

APPRAISAL OF GOODS.

Section 9 of the act will also go into effect immediately. This section provides:

"Sec. 9. If upon the appraisal of imported goods, wares and merchandise it shall appear that the true and actual market value and wholesale price thereof, as provided by law, cannot be ascertained to the satisfaction of the appraiser, whether because such goods, wares and merchandise be consigned for sale by the manufacturer abroad to his agent in the United States, or for any other reason, it shall then be lawful to appraise the same by ascertaining the cost or value of the materials comprising such merchandise at the time and place of manufacture, together with the expense of manufacturing, preparing and putting up such merchandise for shipment, and in no case shall the value of such goods, wares and merchandise be appraised at less than the total cost or value thus ascertained."

TARIFF REGULATIONS.

As soon as the official copy of the tariff bill reaches the department, the proper officers will be placed in charge of it, and regulations necessary to carry it into execution will be prepared and circulated."

IS THE TARIFF BILL CONSTITUTIONAL?

Information has been received here that some parties doubt the constitutionality of the tariff bill, and will test that point in the Supreme Court of the United States. It was remarked by a prominent practitioner before that tribunal, that there was no doubt in his mind that this law would involve endless litigation if the dissatisfied parties chose to adopt that course of resisting its provisions; but that such suits would not stay the operation of the law. In the event of a suit growing out of an alleged collection of an improper duty, the action of the court would only apply to that specific case, and on the very next importation of the same articles the Government would collect the same duty, and continue to do so until the Supreme Court decided otherwise. It is not known, however, how the constitutional issue could be made or sustained, although, as was remarked, there are two sides to the question. The bill was regularly passed, and not with any more indecent haste than a great many other measures under similar circumstances. The House waived its point of prerogative."

THE ONLY REMEDY.

The only hope of settling this question satisfactorily to all the people interested will be by the voice of the people themselves. The apathy which existed among manufacturing classes all over the country resulted in the election of a powerful free-trade element, and they will run the policy of the next Congress. Those who aided in passing the bill claim that they were pressed by their friends from all parts of the country not to adjourn without settling the question some way, and that the bill was passed; and while not fully satisfied, it was the best that could be had. A tribunal higher than the Supreme Court—the people—can give a verdict, but to reach that it will be necessary to send people to Congress who will not talk tariff for protection on the stump, and vote tariff for revenue only on the floor of Congress."

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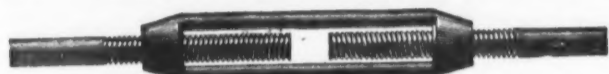
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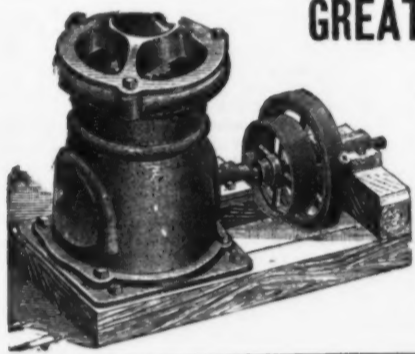
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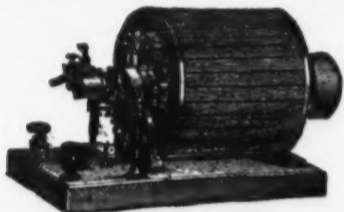
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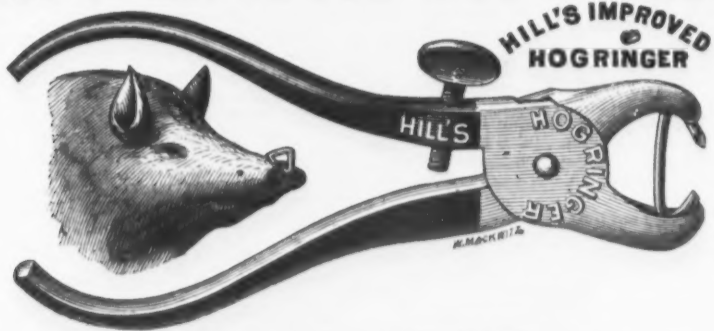
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Protoxide Iron	23.02	Carbonic Acid	—
Protoxide Manganese	32	Phosphoric Acid	37
Alumina	3.27	Titanic Acid	—
Magnesia	1.76	Sulphur	58
Lime	1.65	Soda	—
		Water, &c.	53.31 %
Metallic Iron	24.		
Metallic Manganese	16.		
Phosphorus	—		

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The ores are guaranteed to yield 50 % Metallic Iron.

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Are used by all leading stove
manufacturers.

Experienced men sent to put
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chasers.

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We call attention to infringe-
ments of the Weston Machine
in which Automatic Switches
are used to prevent change of
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owners by grant or purchase
of all forms of Automatic
Switches for Plating Machines.
The adoption of these ma-
chines will certainly lead to
great loss to parties purchasing
or using them.

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Factories at Pike Station, N. H.

and Evansville & Westmore, Vt.

Genuine Old Bell, ble,

Indian Pond (Red End),

Premium, Union,

White Mountain,

Lepelle, Hacker,

Diamond Grit,

The New Boss,

Lamplighter, Rary,

Willoughby Lake,

Green Mountain,

Black Diamond,

Mowing Machine,

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Stones made, labeled and branded in any style de-
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MANUFACTURERS OF

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Agent for PHOENIX LOCK WORKS, Locks
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PARAGON LOCK WORKS, Jail Locks; FALLS
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TON FOUNDRY, Soft, Gray and Malleable Cast-
ings; L. J. GAYLORD, Gimlet and Bug
Borers; U. S. TOOL CO., Screw Drivers,
Acme Can Openers and Handles.

Machinery for Forging Anchors.

We present herewith a recent and rather ingenious improvement in the manufacture of anchors, made by Mr. John Nock, of Hasken, on the Golden Horn, Constantinople. By this method the anchors are manufactured in one piece, the several limbs of the anchor being rolled into shape by a rolling apparatus especially designed for this

the anchor to their desired shape and taper, and with the required protuberances on them.

The work for anchor rolling mill is prepared in the following manner: Either a flat slab or bloom, if steel is to be used, is taken, and in this slab are punched holes *a* of a C shape, as shown in Fig. 7; the metal is severed by oblique cuts *b*, taking care to provide between each hole and the next

capable of pumping 5000 gallons of water a minute, Sickie's steam steering gear, and a Providence steam windlass, made by the American Windlass Co., of Providence, R. I. She is a fine, able-looking vessel, and has an estimated capacity of 100 carloads of freight.

The hull is rather a peculiar one, as the reader will see from the following particulars: It was built by Montgomery & Howard, of

boiler and aft of aft boiler. Engine frames and keelsons of Georgia pine. Rudder of white oak, 16 inches diameter of stock. Backing and filling secured by 1½-inch yellow metal bolts, and hung with three sets of 4-inch braces and pintals of composition fastened with copper bolts. Sponsons extend from aft wheel beam to stern-post, and from forward wheel beam to where guard extends, only 20 inches outside of main hull. Sponson timbers of yellow pine and hackmatack; planking, yellow pine, 2½ by 4 inches, well fastened, calked and smoothed. Hull is strapped inside of frame with diagonal iron straps, 4 inches wide and ¾ inch thick, with belt strap extending all around vessel, 6 inches wide and ¾ inch thick. Hull, throughout, built of the best material for the purpose, thoroughly fastened and without superior adroit.

A novelty in her construction is the absence of the conventional hog-frame. In its place, however, and to obtain the requisite longitudinal vertical rigidity, a Howe truss-bridge frame—has been built in her hold. The upper chord of this truss, which is about 200 feet long, fore and aft, supports the deck beams, and the lower chord is bolted to each frame. Additional longitudinal strength is supplied, too, by a network of iron cross-bracing on the inside of her frame. These diagonal straps are of flat iron, 4 x ¾, and are connected to an iron belt-plate, 6 x ¾, which extends clear fore and aft parallel to and behind the clamp-streak. This cross-bracing runs downward to and is fastened in the floor timber heads. The interstices between her frames are filled in with white pine, navy fashion, and the joints calked, thus making her floor solid from stem to

At the beginning of the present year Mr. Rainear leased a large building at No. 35 South Twenty-third street, and placed in it all of the necessary machinery for manufacturing iron and steel wire for all purposes. The establishment is called the Keystone Wire Works, and at present it contains 16 wire blocks, with a daily capacity of 3½ tons of wire. Mr. Rainear intends shortly to add 24 blocks more, and his total daily capacity will then be about 8 tons of wire. The product at present is market and screw wire,

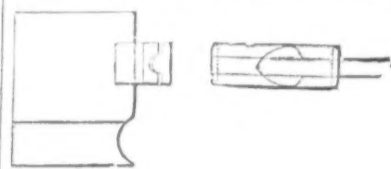


Fig. 8.—Swage for Spreading out Flukes.

made principally from imported wire rods. Mr. Rainear says that the demand for his wire is very good.

NEW PUBLICATIONS.

STORAGE OF ELECTRICITY. By Henry Greer. Size, 3½ by 5½; 62 pages; illustrated. Price, paper, 8¢; cloth, 12¢. Published by New York Agent, College of Electrical Engineering.

This pamphlet contains a number of papers on the storage of electricity and descriptions of many of the leading storage batteries that have been proposed or used. Much of the matter has appeared in public prints, al-

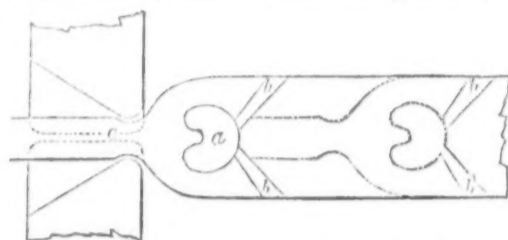


Fig. 7.—Method of Severing and Punching Slabs.

stern. Her ceiling is calked also, that her compartments, of which she has four, may be truly water-tight. She has three watertight bulkheads, the first, or the collision bulkhead, being 20 feet abaft the stem; the next one going aft, just forward of the forward boiler; the next just abaft of the after boiler. Her main deck, or freight deck, is laid in yellow pine, calked and sheathed over with 1½ spruce.

When the boat was built no great speed was expected, but the performances on a few of the recent trips are rather surprising. The boat was intended to make the time from dock to dock between New York and Fall River, a distance of 181 miles, in 12 hours, when carrying a maximum load of 600 tons. On the second trip, loaded with more than 700 tons, dead weight, and carrying only 75 pounds of steam, she came through in 13 hours against a strong ebb tide. The large amount of freight was the result of a number of foggy days in the week previous, during which freight had accumulated at Fall River to an unusual extent. When it is considered that previous to her first trip the engines had never been run more than two hours consecutively, and that since she has started the engine has not had to be stopped on account of the engine itself, we think that the builders have reason to be proud. Up to the present time the bearings have not been warm on any trip yet made. The engine works very quietly and keeps its rate of 23 to 26 revolutions a minute without trouble. On the night of February 21 she made the run from dock to dock in 16 hours and 28 minutes, with a load of 400 tons. This is an average of 17½ miles per hour with 75 pounds steam-pressure. On the first trip, with wheels making 24½ revolutions and having a dip of 5 feet 9 inches, the engine, with 75 pounds of steam, developed 1775 horse-power. The boat was at that time making 15.2 miles per hour between Point Judith and Little Gull Island, tide ebb. Up to the present time the following are the averages of the boat:

Average time from dock to dock, 11 hours, 4 min.
Average speed per hour, 16.3 miles.
Average steam pressure, 75 pounds.
Average load, 445 tons net.
The tide during the time which these aver-

though there is a considerable portion that is new. The views taken of the possibilities of the storage of electricity are of the most rose-hued character, and the author is evidently fully convinced that their future, even in the forms now in use, is very great.

THE RAILROAD SPIRAL. The Theory of the Compound Transition Curve Reduced to Practical Formulas, &c. By Wm. H. Searles, C. E. &c. Size, 4 x 6½ inches; 55 pages. Price, \$1.50. Published by John Wiley & Sons, New York.

The wear and tear caused to both permanent way and rolling stock by the abrupt

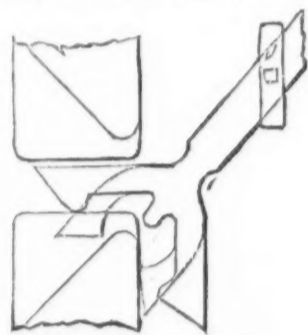
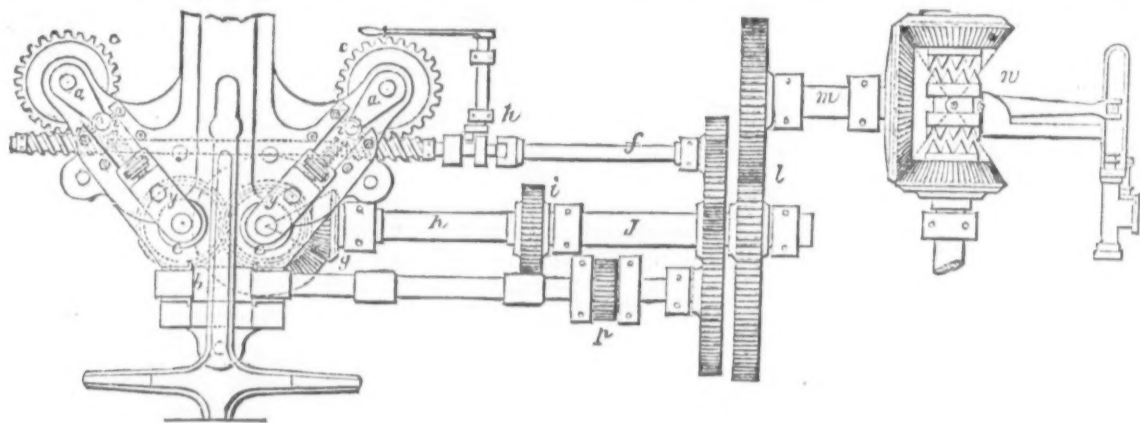


Fig. 9.—Method of Opening Out Jaws.

change in direction from a straight line to a curve has long been recognized by railroad men, and has demonstrated the usefulness of the intermediary multiform compound curve between the tangent and the circular curve. The use of the cubic parabola as such a transition curve has not met with much practical application, on account of the fancied difficulties in laying it out with transit and chain, and the amount of algebraic work supposed to be involved in its adoption. In the above little handbook, which is in convenient pocket form, the author has reduced the theory of this curve to a practical and convenient form for ordinary field work, involving no greater difficulty than the running of circular curves. The book



Machinery for Forging Anchors.—Fig. 1.—Plan View of Anchor Rolling Mill.

purpose. This rolling apparatus, which is shown in plan, side and end elevation in Figs. 1, 5 and 6, respectively, consists mainly of a pair of horizontal rolls, which, while they revolve, are adjustable nearer to or further from each other, and of a pair of vertical rolls close beyond them, these being also adjustable, so that the shank and limbs of the anchor, in passing through between these rolls, as indicated in Fig. 4, while the rolls of each pair are themselves made to approach toward or recede from each other, receive the desired form and taper; *a* and *d*, Fig. 6, constitute the framing containing the

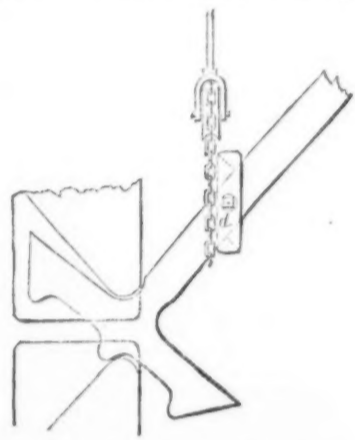


Fig. 2.—Method of Swaging Jaws.

bearings for the horizontal rolls *b b* and for the vertical roll *c c*. The bearings of the upper rollers are fitted to slide vertically, so that these rolls can be raised or lowered by screws connected by wheels *t t*, gearing with an intermediate wheel, *u*, which can be turned by a hand-wheel or by a worm wheel, *v*, driven, when required, by a countershaft. The upper bearings for the vertical rolls *c c* are in blocks *y y*, Figs. 1 and 5, fitted to slide diagonally, these blocks being connected by adjusting screws to slides *z z*, linked to cranks *a a* fixed on the vertical axis of the worm-wheels *c c*, so that on turning the shaft of the worms that gear with the wheels *c c* in the one direction or the other, the rollers *c c* can be caused to approach toward

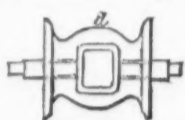


Fig. 3.—Dog (d) Fixed on Shank to Prevent Bridle-chain from Slipping.

or to recede from each other. The vertical shafts *e e*, Figs. 5 and 6, of the rolls *c c* are connected to wheels *f f* by couplings sufficiently loose to permit of the to-and-fro movement of the rolls, and in like manner the shafts of the horizontal rolls *b b* are loosely coupled to the wheels *p p*, by which they are geared together. The gearing for driving the mill is as follows: A main shaft, Fig. 1, by means of clutch and bevel reversing gear *n*, drives a shaft, *m*, which, by gear wheels *l*, drives a countershaft, *j*. From this shaft by gear *k* the shaft of the lower roll *b* is driven, and by gear *i* is driven a shaft, *h*,

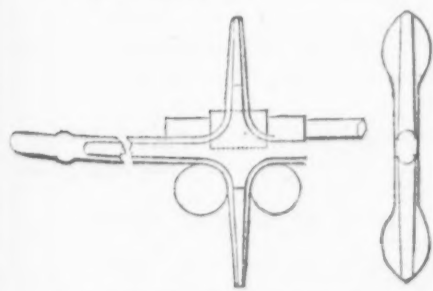


Fig. 4.—Bringing Limbs of Blank to Shape.

which by bevel gear *g* drives the shaft of one of the vertical rolls *c c*. From *k* is also driven a countershaft, *f*, which works the worms of the wheels *c c*, a clutch, *h*, and hand lever being provided for coupling the worm-shaft to *f* or uncoupling it as required. The reversing clutch *n* is worked by the piston of a steam or hydraulic cylinder, as shown in Fig. 1, according as the slide of that cylinder is moved by hand. As the anchor is passed through between the rolls, the clutch levers are manipulated so as to vary, as required, the distances of the rolls from each other for forming the several limbs of

sufficient metal, which is forged down to a square section convenient for rolling to form the shank, and is hollowed in at the neck *c* by suitable swages, also shown in Fig. 1. The blank thus formed has its jaws opened apart by swaging, as shown in Figs. 2 and 9. For convenience of holding and turning the blank there is fixed on its shank a dog, *d*, shown in plan at Fig. 3, which prevents the bridle-chain from slipping up the shank. The flukes are then spread out by swages, as shown in section and plan at Fig. 5, these swages being shaped to form the rounded rib or continuation of the arm behind the palm. The blank so far prepared has its limbs brought to shape, as shown in the side and end views, Fig. 4, by rolling them successively between rolls arranged so as to give the required taper and variations of width and thickness at different parts of the limbs. After the rolling, the two arms which stand at right angles to the shank, Fig. 2, are bent to the required curvature. The curving of each arm may, however, be done or partly done while it is undergoing its last rolling by

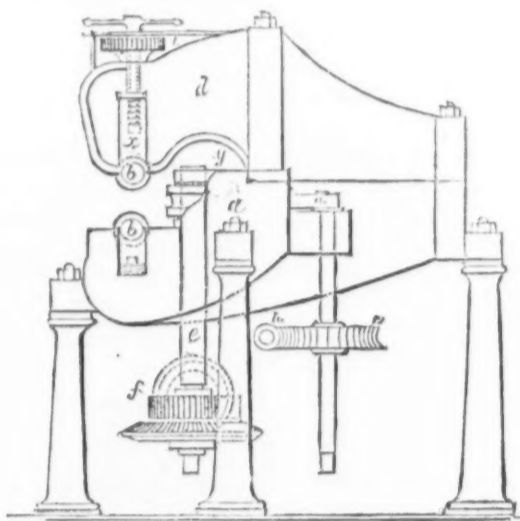


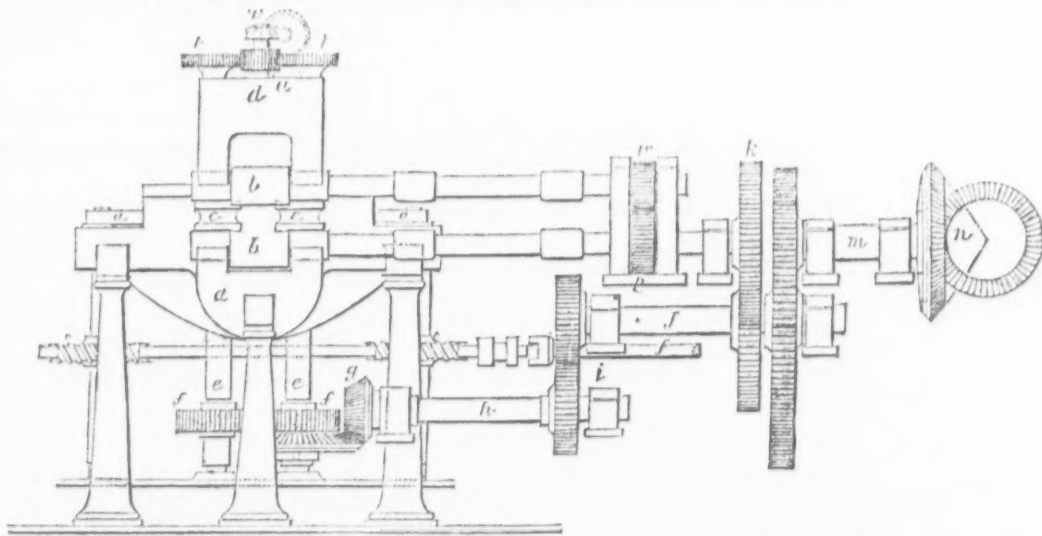
Fig. 5.—End View of Anchor Rolling Mill.

attaching the shank by a chain to a fixed point of the framing of the mill, so that the arm, while passing between the rolls, is made to travel in a curve. Finally the hole is made in the shank at the forge. For anchors which have their arms jointed to the shank, the same apparatus is applicable to roll the shank to shape as one piece and to roll the two arms to shape as a separate piece.

The Steamer City of Fall River.

The new freight steamer City of Fall River, of the Old Colony Steamboat Co.'s line, has been attracting a good deal of attention lately on account of the novelties introduced in her construction. The most interesting engineering feature is the compound beam engine of 2000 horse-power, built by W. & A. Fletcher, North River Iron Works, this city, and the feathering paddle-wheels. The compound engine is a novelty in paddle-wheel steamers. We think she is the first side-wheel boat with compound engines which has been built since those designed so many years ago by Erasmus Smith. The engine, however, is decidedly different from those, in having two separate cylinders. In general appearance it is similar to that of the ordinary beam engine, but instead of one cylinder the engine has two, one of which is 44 inches in diameter by 8 feet stroke, taking steam from the boilers at high pressure and exhausting it into a second cylinder 68 inches in diameter with 12-foot stroke. The wheels, though of a pattern common enough in England and elsewhere, are very unusual here. They are the Morgan feathering wheel, 25 feet 6 inches in diameter outside of the bucket, and are of extraordinary strength. Each wheel has 12 buckets 10 feet long, 5 inches thick and 40 inches wide. The boilers are two in number, of the "Redfield" tubular pattern, 17½ feet wide and 15 feet long, each having two shells 7½ feet diameter, made of Otis steel ¾ inch thick and double riveted. Each shell contains 110 tubes 3½ inches diameter and 12 feet long. Each boiler has connected with it a superheater, with uptake 56 inches diameter, and outer shell 96 inches diameter. Boilers are placed one forward of the engine and one aft. They are very strongly built and have been tested by a hydrostatic pressure of 150 pounds per square inch. She has a donkey boiler, Worthington duplex steam pump, centrifugal pump with independent engine,

of Georgia pine, each 12 x 28 inches; bilge streaks and ceiling are Georgia pine, one streak, 12 x 18 inches; 5 streaks, 8 x 12 inches; and 5 streaks, 5 x 12 inches, thoroughly edge-bolted. Clamps and stringer streaks are yellow pine, 5 streaks of clamps 8 x 12 inches, and 5 stringer streaks, 6 x 12 inches, thoroughly edge-bolted and keyed with oak and locust keys. Beams of Georgia pine, 6 x 10 inches and spanned same as frames, 26 inches, center to center. Each beam has two hackmatack knees, siding 7 inches, with double knees at wheel, engine and boiler beams. Each alternate beam has



Machinery for Forging Anchors.—Fig. 6.—Back View of Anchor Rolling Mill.

hanging knee outside of hull under guard. Plank-shear of white oak, 5 x 22 inches; main deck of white pine, 3½ x 5 inches, sheathed with spruce 1½ inches thick. Planking is white oak; first garboard streaks 6 inches, second garboards 5 inches and the remainder 4 inches. All fastenings copper and yellow metal, and locust-tree nails up to 14 feet water-line; above that galvanized iron and locust-tree nails. Three water-tight bulkheads, one 20 feet aft of stem, and the others forward of forward

ages cover has been even for and against the boat.

A New Wire Works in Philadelphia.—Since the American Iron and Steel Association compiled its list of the wire-drawers and rod mills in the United States, which was recently published in our columns, a new wire-drawing establishment has been started in Philadelphia. The works are owned by Mr. T. R. Rainear, who was formerly connected with the Philadelphia Wire Works.

forms a valuable appendix to "Field Engineering," by the same author, contains many valuable tables, and is likely to meet a hearty welcome from railroad engineers.

The five copper mines in Michigan which have declared dividends during the past year have a paid-up capital of \$2,500,000, and the dividends paid amount to \$2,000,000. The Calumet and Hecla, which has a capital of \$1,200,000, paid its stockholders in the past year \$2,000,000.

We invite the attention of Iron Manufacturers to the advertisement, among our Special Notices, signed "M. S. C." The house advertising is long established and well known.

The George Place Machinery Co. also announce the sale at auction of a valuable manufacturing property and a lot of machinists' Tool Patterns, for particulars of which see Special Notices.

The following new prices on Cordage were adopted yesterday. It will be noticed that the prices of Manila are reduced 1/2 cent per pound, and those of Sisal advanced an equal amount. These prices are subject to the usual discount to the trade of 1 cent per pound:

MANILA ROPE.	CIR. 1/2 IN.
1 1/2 inch cir. and upward.....	16
1 1/2 thread, or 3/4 inch diameter.....	12 1/2
6 and 9 thread, or 1/2 and 5/8 diameter.....	12 1/2
Hay Rope, 2, 3, 4 or 5 thread.....	12 1/2
Bolt and Point Rope.....	12 1/2
Tarred Rope and Lath Yarn.....	12 1/2
Stave, Leather and Hop Twine.....	12 1/2

SISAL ROPE.	CIR. 1/2 IN.
1 1/2 inch cir. and upward.....	12 1/2
1 1/2 thread, or 3/4 inch diameter.....	12 1/2
6 and 9 thread, or 1/2 and 5/8 diameter.....	12 1/2
Hay Rope, 2, 3, 4 or 5 thread.....	12 1/2
Bolt and Point Rope.....	12 1/2
Tarred Rope and Lath Yarn.....	12 1/2

RUSSIA HEMP.	CIR. 1/2 IN.
White Rope.....	17
Tarred Rope and Ratline.....	12 1/2
Spin Yarn.....	10 1/2
Bolt Rope.....	12 1/2
Marline, Houseline, Rounding and Hambroline.....	12 1/2
Packing.....	10

AMERICAN HEMP.	CIR. 1/2 IN.
White Rope.....	18
Tarred Rope and Ratline.....	12 1/2
Spin Yarn.....	10 1/2
Bolt Rope.....	12 1/2
Marline, Houseline, Rounding and Hambroline.....	12 1/2
Packing.....	10

ITALIAN HEMP.	CIR. 1/2 IN.
White Rope.....	18
Tarred Rope and Ratline.....	12 1/2
Spin Yarn.....	10 1/2
Bolt Rope.....	12 1/2
Marline, Houseline, Rounding and Hambroline.....	12 1/2
Packing.....	10

JUTE.	CIR. 1/2 IN.
Rope and Packing.....	8

In their discount sheet, just issued, the Nason Mfg. Co. quote Plain and Galvanized Wrought Iron Pipe as previously, discount 6 1/2 per cent. They express their view of the condition of the market as follows:

"It is not positively certain that during the ensuing month prices will be any stiffer than they have been during the past two, but at the present rates it affords the manufacturer little, if any, profit; so that, for spring requirements, our friends cannot greatly err in laying in what they are likely to need for some little time to come, especially as, with the opening of river and canal transportation, the demand is sure to be largely increased."

The prices for Malleable Iron Fittings have been changed to the following:

Classes.....	A.	B.	C.	D.
Price, plain, per pound.....	15	13	11	10
galvanized, per pound.....	15	13	11	10

The discount on Globe and Angle Valves has been increased to 60 per cent., and the following reduced list adopted:

No.	1/2	3/4	1	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24	30	36	42	48	60	72	90	120
Size.....	1/2	3/4	1	1 1/2	2	2 1/2	3	3 1/2	4	5	6	8	10	12	14	16	18	20	24	30	36	42	48	60	72	90	120

Bibbs and Stops for steam and water are now discount 50 instead of 45 per cent., and Peet's Patent Valves and Gates, discount 40 instead of 37 1/2 per cent. Otherwise prices remain unchanged.

IRON.

American Pig.—The improvement noted last week continues, and a fair amount of business has been done. There is, however, no eagerness manifested on the part of buyers, who show no desire to forestall their requirements or to indulge in anything like speculation. There has been so little inducement to buy beyond immediate wants that stocks in the hands of consumers are everywhere low. We note sales of 5000 tons Thomas No. 1 X and 2 X at \$24 and \$22 respectively, and 1000 tons Chestnut Hill No. 2 X at \$22. Some brands are held nominally at 50¢ above these prices, but we hear of no sales. We quote standard brands, \$24 @ \$24.50 for No. 1 X Foundry, and \$22 @ \$22.50 for No. 2 X Foundry, and Gray Forge \$19.50 @ \$20.50.

Scotch Pig.—Transactions have been small, but the demand is sufficient to take up arrivals, which of late go into store with few exceptions. Sales of perhaps 800 tons of various brands have taken place. There is little change in quotations, most of which could be shaded however. We quote Eglington, \$21 @ \$22; Carnbroe and Glengarnock, \$22 @ \$23; Coltness, \$24.50 @ \$25; Gartsherrie and Langloan, \$24.25 @ \$25, and Summerlee, \$24.25 @ \$24.75.

Manufactured Iron.—This branch of the market is very quiet, though a firmer and more satisfactory feeling now prevails than has been experienced for several months past. There have been no sales except in small quantities to supply immediate necessities, but buyers are manifesting more interest, and we learn of several inquiries for large lots for early delivery. From the general tone of the market it is believed that the bottom prices have been reached, and dealers are hopeful of doing a brisk trade within the next few weeks. Business during the week has been done on a base price from store of \$2.40 @ \$2.50 for Refined Bars, and \$2.25 @ \$2.30 for Common.

Steel Rails.—There is a good deal of inquiry, and we hear of some transactions at \$30, at mill, a price at which the Eastern mills are firm.

Old Rails.—We note the sale of 1000 tons old T's (American) at \$22.40, at New York, and 300 tons, ex-store, at \$21. We quote T's \$23 @ \$23.50. There are a few Double Heads held at \$27.50.

Scrap Iron.—Demand has been light, with few sales. We note sale of 1500 tons for shipment at \$25. We quote \$25 @ \$26.50.

METALS.

Copper.—Sales for the past week have not exceeded a couple of hundred thousand lb. We quote Lake, 17 1/2¢ @ 17 3/4¢; "Anchor" brand, 17 1/4¢, and Baltimore, 15 1/4¢, nominally. It is reported that on a moderate scale some buying of Lake Copper for export has commenced at 16¢. In London Chili Bars were quoted yesterday \$66, which is 10¢ better, while Best Selected remained \$71. To-day we received the following cable dispatch: "Market active and prices tend in sellers' favor. Best Selected, \$71 @ \$72, and Chili Bars, \$65 1/2 @ \$66 1/2." Manufacturers have made no change in prices. They quote bottoms, 31¢ @ 32¢; Braziers', 30¢ @ 31¢; Circles, 33¢ @ 36¢; Sheathing, 28¢, and Bolt Copper, 30¢; Segment Sheets, 33¢; Fire-Box, do., 30¢.

Tin.—Under the influence of an improving London market, a better demand has developed in ours, at gradually hardening rates, wholesale lots being worth 21 1/4¢ @ 21 1/2¢, Straits, and jobbing do., 21 1/2¢. Lamb and Flag may meanwhile be quoted 22 1/2¢.

IMPORT INTO THE UNITED STATES.	1882.	Value.
Copper.....	21,034	\$5,816,082
Re-export.....	2,122	58,041
Net import.....	18,912	\$5,777,469
Tons.....	30,491	

Re-export.....	Value.
.....	\$4,188,641
.....	639,366
Net import.....	\$5,777,469
Tons.....	7,876

London was cabled last night £95. 10/8, Straits. This afternoon we receive the following message: "There is an improved tone to the market and prices tend upward. A moderate business has been done during the week. Straits, Ingot, spot, £95. 10/8 @ £96, and futures, £96. 10/8 @ £97." Tin Plates.—Since our last report a great quiet has prevailed in this article, the closing quotations being the ensuing ones, large lots, ordinary brands, 7¢ box; Charcoal Bright, \$5.87 1/2 @ \$6.50; do. Ternes, \$5.25 @ \$5.40; Coke Tin, \$5.10 @ \$5.20, and do. Ternes, \$5. Liverpool came yesterday, Charcoal, 18 1/2 @ 21/6, and Coke, 15 1/2 @ 17. We are informed to-day from London that the market is quiet, with a good business doing.

IMPORT INTO THE UNITED STATES.	1882.	Value.
Copper.....	4,270,738	\$17,975,161
Re-export.....	3,703	103,733
Net import.....	4,267,035	\$17,871,428
Tons.....	212,802	

Re-export.....	Value.
.....	\$14,886,907
.....	48,861
Net import.....	\$14,838,046
Tons.....	182,537

Lead.—The large dealings in Common Domestic alluded to a week ago as going on at the time have summed up 3000 tons, inclusive of the 800 tons we then mentioned as sold. The price obtained was \$4.60 @ \$4.65, the greater portion at the outside figure. Since then the market has become quiet once more, with \$4.70 asked for Common Domestic. In Refined nothing transpired; the same may nominally be quoted 4 1/4¢. At East St. Louis 400 to 500 tons Soft sold at \$4.35. From London we are wired this afternoon to the following effect: "Market quiet and prices steady. Common English Pig, £13. 10/8 @ £13. 15/8." Manufacturers are quoted as follows: Lead Pipe, 6 1/4¢; Sheet Lead, 7 1/4¢; Tin-lined Lead Pipe, 15¢ @ 16¢, and Block-tin Pipe, 45¢, less the usual discount to dealers.

Spelter and Zinc.—A slightly better feeling at length begins to manifest itself, on the basis of 4 1/4¢ for Common Domestic, while Silesian is nominally worth 5 1/4¢. A pretty good opinion is entertained about the future of this metal in our midst. The import for the months of January and February has been moderate, say between 500 and 600 tons all told.

IMPORT INTO THE UNITED STATES.	1882.	Value.
Spelter.....	25,651,567	\$1,044,344
Sheet zinc.....	4,665,562	215,793
Total.....	30,317,129	\$1,260,137
Re-export, sheet zinc.....	21,315	53
Net import.....	29,302,814	\$1,259,534
Tons.....	13,525	

Spelter.....	Value.
.....	\$216,121
.....	\$216,121
Net import.....	\$1,259,534
Tons.....	3,643

We quote Bertha Refined, 8 1/4¢, and Bergengport, 9 1/2¢. Sheet Zinc, according to size, sells at 6 1/2¢ @ 6 3/4¢, after the enhancement in price we spoke of in our last report. From London we receive the ensuing cable message to-day: "Spelter is quiet and prices steady. Ordinary, at shipping ports, £15. 7/6 @ £15. 12/6."

Antimony.—Has relapsed into dullness; Hallett at 10¢, and Cookson at 11¢.

FOREIGN TRADE MOVEMENTS.

The following is a summary of foreign trade movements during the past week:

IMPORTS.	1881.	1882.	Value.
Total.....	\$9,530,192	\$5,221,247	\$10,305,183
Prev. reported.....	70,496,688	57,372,300	\$1,602,202
Since Jan. 1.....	\$8,833,504	\$5,529,277	\$8,702,981

Included in the imports were articles of merchandise valued as follows:

Antimony.....	Value.
.....	\$4,000
.....	170
.....	2,708
.....	4
.....	5,830

Bronzes.....	15	3,690
Chains and anchors.....	55	2,426
Clocks.....	41	5,014
Copper.....	41	2,900
Cutlery.....	129	30,253
Cutlery.....	1	30
Cutlery.....	65	10,809
Hardware.....	80	2,817
Iron, hoop, tons.....	2,996	61,801
Iron, pig, tons.....	108	5,839
Iron, sheet, tons.....	241	1,973
Iron ore, tons.....	331	926
Iron, other, tons.....	1,372	48,740
Railroad bars.....	4,189	3,118
Machinery.....	91	6,406
Metal goods.....	130	18,257
Nails.....	91	711
Needles.....	25	8,056
Nickel.....	16	2,668
Old metal.....	2	2,233
Platina.....	7	17,251
Pins.....	3	406
Quicksilver.....	200	5,237
Saddlery.....	21	3,799
Silverware.....	69,778	142,370
Silverware.....	70	141
Silverware.....	5	585
Tin, boxes.....	51,815	28,327
Tin, bbls.....	29	1,000
Tin, 4,485 slabs, lbs.....	60,466	134,884
Wire.....	3,383	3,383
Zinc.....	4,822	210

The quantity of leading articles imported compares with previous dates as follows:

For the 10 weeks week of 1883.	Same time 1882.	Value.
Cutlery, pkgs.....	129	1,405
Hardware, pkgs.....	80	2,817
Iron, R. L. bars.....	4,189	33,019
Lead, pkgs.....	10	3,686
Steel, pkgs.....	69,778	424,473
Tin, bbls.....	51,815	334,253
Tin slabs, lbs.....	60,466	1,424,957

EXPORTS OF SPECIE.

For the week ended March 10:

Total.....	\$227,578
Previously reported.....	2,254,782
Total since January 1, 1883.....	\$2,482,360
Same time in 1882.....	12,214,748
Same time in 1881.....	2,447,080
Same time in 1880.....	2,554,798
Same time in 1879.....	3,966,087
Same time in 1878.....	4,145,799
Same time in 1877.....	3,743,638
Same time in 1876.....	911,996
Same time in 1875.....	3,049,818
Same time in 1874.....	1,107,341
Same time in 1873.....	627,834
Same time in 1872.....	535,210

EXPORTS EXCLUSIVE OF SPECIE.

For the week ended March 13:

Total.....	\$8,385,399	\$6,150,100	\$7,507,410
Prev. reported.....	57,391,597	57,929,553	62,798,816
Since Jan. 1.....	\$75,776,996	\$64,109,653	\$70,306,226

IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending March 14, 1883.

Hardware.

Baker Hermann & Co.	Hardware, cutlery and guns, case, 65
Brown Wm.	Chains, pkgs., 25
Davies & Co.	Case, 2
Degraw, Aymer & Co.	Case, 2
Downing, Sheldon & Co.	Arms, case, 44
Drexel, Morgan & Co.	Guns, case, 44
Duden & Co.	Machinery, bbls., 3
Field Alfred & Co.	Case, 62
Mide, case, 3	Packages, 7
Anville, 10	
Frasse P. A. & Co.	Mide, case, 1
Graef Cutlery Co.	Case, 2
Harley & Graham.	Arms, case, 12
Hensel, Bruckmann & Lorbach.	Machinery, case, 34
Kastor A. Co.	Case, 1
Marshall James.	Sash chain, case, 2
May Charles.	Mide, case, 3
Mide, case, 3	
Moore's J. P. Sons	Case, 6
Morgan W. Co.	Machinery, bbls., 150
Moss F. W.	Files, case, 4
Spellman & Co.	Mide, case, 3
Squires H.	Mide, case, 1
Sellers W. B. & Co.	Mide, case, 3
Strutler Lau & Co.	Mide, case, 3
Taylor Thos.	Mide, case, 2
Ward, Adams, & Co.	Mide, case, 13
Wandell Wm.	Case, 1
Wiesbush, Hilger & Co.	Hardware, cutlery and guns, pkgs., 31
Witte John G. & Bro.	Cutlery, case, 4
Order.....	Machinery, bbls., 10
Machinery, pkgs., 30	
Pots and covers, 124	
Tin plates, case, 100	
Iron Clad Mfg. Co.	Turned sheets, case, 7
Jex Wm. & Co.	Old copper, case, 1
Lamarche H. & Sons.	Spelter, ingots, 1470
Ludmann C.	Bundles, 4
Meier Geo. & Co.	Metal, case, 10
Nieder C. W. & Co.	Copper, bbl., 1
Phelps Dodge & Co.	Tin plates, bbls., 12,429
Tin plates, bbls., 35	
Tin ingots, 40	
Antimony, case, 83	
Zinc sheets, case, 31	
Ramsay C. H. & Co.	Flumago, bbls., 2
Stevenson, Furness & Co.	Metal sheathing, case, 60
Vivian Younger & Bond.	Tin plates, bbls., 1000
Wittmann Bros.	Capsules, 37
Order.....	Black taggers, bbls., 147
Tin plates and taggers, bbls., 2760	
Tin plates, bbls., 21,203	
Copper, bbls., 3248	
Copper, tierce, 1	
Tin, slabs, 2074	
Spelter, ingots, 1233	
Lead, pkgs., 159	
Metal, ingots, 29	
Antimony, case, 100	
Tin sheets, case, 38	

EXPORTS
Of Hardware, Iron, Machinery, Metals, &c., from the Port of New York, for the week ending March 13, 1883.

Danish West Indies.

Quant. Val.	Quant. Val.
Ptms, gals., 3406	\$445
Hdw, pkgs., 3	130
Mf. iron, pkgs., 2	19
Ag. imp, pkgs., 4	38

Dutch West Indies.

Quant. Val.	Quant. Val.
Nails, kegs., 3	14
Ptms, gals., 221,355	16,468

Dutch East Indies.

Quant. Val.	Quant. Val.
Ptms, gals., 65,100	72,000

Hamburg.

S. m. needles, case,	1	175	Nails, cs.	14	66
Hdw., pkgs.,	7	302	Hdw., pkgs.,	97	1,752
Clocks, pkgs.,	179	4,410	Pumps, pkgs.,	3	67
Mach'y, pkgs.,	9	951	Ag. imp, pkgs.,	26	637
Br. goods, cs.,	1	150	Spikes, kegs.,	75	1,900
Mf. iron, pkgs.,	12	1,000	Lead, bbls.,	1	30
Sew. ma., case,	1053	12,912	Flbr'y mtl., pgs.,	4	90
Arms, case,	1	172	Br. g'ds, case,	1	142
Ag. imp, pkgs.,	7	830	Mach'y, pkgs.,	85	2,149
Ag. imp, pkgs.,	7	830	Cutlery, cs.,	140	2,243
Ag. imp, pkgs.,	7	830	Nails, kegs.,	102	429
Ag. imp, pkgs.,	7	830	Ag. imp, pkgs.,	26	637

Copenhagen.

Mach'y, pkgs.	9	630	Clocks, pkgs.	6	143
Hdw., cs.....	13	200	Ptim., gals.	157,322	13,563

Bremen.

Pul. gals...	1,123,571	98,866	Mach'y. pkgs.	26	1,275
			Ptms. gals.	63,000	6,680
			Ag. imp. pkgs.	54	1,413
Naph. gals.	100,273	10,018	Pumps. pkgs.	2	108
Hdw. pkgs.	45	1,327	Hdw. pkgs.	162	3,219
Cutlery, cs.	22	1,200	Tacks, cs.	30	548
Ag. imp. pkgs.	45	2,147	Scales, cs.	3	81

Amsterdam.

Hdw., pkgs...	17	650	Mf. iron, pkgs	55	220
Scales, pkgs...	60	1,080			

Rotterdam.

Quant. Val.	Quant. Val.
Ptms, gals., 278,405	21,500

Antwerp.

Firearms, cs.,	2	50	an. iron, pkgs.	322	3,729
Mach'y, pkgs.	2	400	Sew. ma., cs.,	95	2,812
			Mach'y, pkgs.	122	6,468

Liverpool.

Guns, case.....	1	50	Pumps, pkgs.,	3	155
Sew. ma., case.....	610	7,528	Scalp, pkgs.,	13	390
Ag. imp, pkgs.....	9	335	Shaws,.....	5	343
Pms, case.....	1	200	China, case.....	1	62
Pistols, case.....	630	50	Clad, bks.,.....	2	73
Mf. iron, pkgs.....	100	305	Pttn., gal.,.....	2	59
Mf. rollers.....	995	50	Cutlery, case.....	130	2,589
Head lights, case.....	6	4	Clocks,.....	7	145
Head lights, case.....	6	4	Nails, kegs.....	20	79
Pttn., gal., case.....	355	600	Needles, case.....	4	24
Hdw., pkgs.....	40	5,920	Cartridges,.....	2	17
Clocks, pkgs.,	331	6,809	Cartridges, (8	2	60
Nr. goods, case.....	8	475	Steel, pkgs.....	7	71
Machine, y. pkgs.,	12	440	Iron, bds.,.....	52	1,761
Rifles, case.....	1	1,094	Shot, bxs.,.....	8	50
S. rollers, kys.,	88	470			
Watch keys, case.....	2	420			

Brasil.

exceedingly unsatisfactory all around. Quotations are nominally about 2.3¢ for Refined Iron, but buyers of large lots can doubtless place their orders at better figures, according to quantity and specification. Common Iron can be had at 2¢, but there is not much demand. Skelp Iron has been in moderate request, and several sales have been made at something like 2.2¢ @ 2.25¢ at mill.

Plate and Tank Iron.—The market does not improve as manufacturers would like to see it, and business during the week has been very disappointing. There are no Tank orders on the market of any account, and prospects are not encouraging as regards that department. Bridge-work is likely to develop about the usual amount of work, and the shipyards will probably require a good deal of material, but there is no immediate prospect of anything like an active demand; hence the weakness in prices. Bridge Plate, Boat Plate and Tank Iron are quoted at 2.5¢, but for large orders prices would doubtless be shaded, while 2.55¢ @ 2.6¢ is asked for small lots.

Structural Iron.—There is only a moderate demand, and many of the mills are running very close on their orders. A reduction was made on Channels, as was noticed in our last quotations, and the combination have made further arrangements by which it is believed that imports will be prevented. Buyers of lots of 200,000 lb and upward will be entitled to discounts, to be named on sending in their specifications. Quotations remain as before: 2.5¢ for Angles, 3.2¢ for Tees, and 3.5¢ for Beams and Channels.

Sheet Iron.—The demand is fair and sales have been on the basis of last quotations, namely, for small lots:

Common Sheets, No. 28.....4 1/2¢
Common Sheets, No. 26 and 27.....4 1/2¢
Common Sheets, No. 24 to 25.....4 1/2¢
Common Sheets, No. 22 to 23.....4 1/2¢
Best Refined 1/2" advance on the above.
Best Bloom Sheets, No. 28 to 29.....7 1/2¢
Best Bloom Sheets, No. 26 to 27.....5 1/2¢
Best Bloom Sheets, No. 24 to 25.....5 1/2¢
Common Rod Plates, 3/16 to 1/8.....1 1/2¢
Blue Annealed, 3/16 to 1/8.....3 1/2¢
Best Bloom, Galvanized, discount.....35¢
Second quality, discount.....45¢

Wrought Iron Pipe.—The market is somewhat steadier than a week ago, and under a slightly increased demand. We quote discounts on Boiler Tubes 55¢ and Steam Pipe 67 1/2¢ @ 70¢ off price list. There appears to be less disposition to shade these figures than a short time ago.

Old Rails.—Nominal at \$25 @ \$25.50 for T's; small lots in demand.

Scrap Iron.—Cargo lots, \$25.50 @ \$26; selected yard lots, \$27 @ \$27.50.

Nails.—Have been in better demand, but any great improvement can hardly be looked for, considering the state of the weather. Prices are still irregular, and sales are made freely at \$3.25, with further concessions on desirable orders.

Bessemer Pig.—There seems to be no disposition to buy, and prices are purely nominal at about \$22 @ \$22.50. Buyers intimate that they expect to place orders at about \$1 below the asking rates.

Spiegel.—A sale of 1000 tons of 20¢ Spiegel was made at \$32 f.o.b. cars Baltimore; also a 500-ton lot at a sterling price, New York.

Crop Ends.—Sales have been made of lots aggregating about 1000 tons at \$21 @ \$21.25, f.o.b. cars at mill. Foreign of certain makes are wanted for shipment at about \$22.

Messrs. Blakely & Walbaum, of this city, have opened a branch office at Nos. 55 and 57 Pine street, New York. The increasing business of this firm renders such a step not only a convenience, but a matter of necessity. They will, as in Philadelphia, make a specialty of metals, iron ores and railroad supplies generally.

Edward Samuel & Co., of Philadelphia, selling agents of the Co-operative Iron and Steel Works, announce that they have lately erected a Siemens-Martin plant, together with a plate train, all of the most modern and approved construction, and are prepared to make steel plates for bridges, boilers, tanks, ships and all other uses, guaranteed to such tests as may be required. Their special brand and trade-mark will be "Cheops."

EASTERN PIG IRON ASSOCIATION.

Philadelphia, March 12, 1883.

To the Editor of The Iron Age.—DEAR SIR: A meeting is hereby called of this association for Friday next, 16th inst., at 12 o'clock, noon, at the Mercantile Club, No. 234 South Third street, Philadelphia, for the purpose of hearing the report of the Committee on Permanent Organization, and for action on such other matters as may be brought before the meeting.

Any firm, corporation or individual manufacturing pig iron for sale in the open market, not represented at the preliminary meeting held in New York January 5th, 1883, is cordially invited to attend.

Respectfully,

HENRY T. ECKERT, Chairman.
J. WESLEY FULLMAN, Secretary.
Committee on Permanent Organization.

PITTSBURGH.

(Special Dispatch to The Iron Age.)

Pittsburgh, March 14, 1883.

The regular monthly meeting of the Western Nail Association was held to-day, and was very fully attended, representatives from all parts of the West being present. Statistics showed that the stocks at mills were exceedingly low, and assessments all broken. It is stated that a majority of the mills could not assort an order for a carload, and that there is not a mill in the West that could supply an assorted order of a thousand kegs at once. The mills are almost out of sizes less than twelve. The association unanimously agreed to begin operations at the factories next Monday, and run three weeks, or 1 p to including April 7; then stop two weeks. No change was made in the card.

Office of The Iron Age, 77 Fourth Avenue,
Pittsburgh, Pa., March 13, 1883.

While there has been no material improvement in the general iron business as yet, a much better feeling has been developed during

the past week, and the opinion generally obtains that a decidedly better trade is near at hand. There has been considerable inquiry within the past few days. Some of the mills are reported as being fully employed, and the indications are that they will soon be working up to their full capacity. In the Ohio and Mississippi valleys people have commenced to recover from the effects of the recent disastrous floods, and the crop reports from nearly all parts of the West and South are more encouraging. Moreover, the tariff agitation being out of the way, people are better prepared to make some calculation in regard to the future. No one expects a boom, nor is it desired, but there is no good reason apparent at present why there should not be a good, healthy business this spring, not only in iron, but in all kinds of Pittsburgh manufactures. It is worthy of mention that, owing to the largely increased railroad facilities, trade is becoming more equalized; jobbers and large consumers, instead of anticipating future wants, as used to be the custom—ordering about twice a year, spring and fall—are now ordering mainly as their immediate wants require, and it is not necessary for them, as in former years, to carry large stocks.

Ores.—Furnacemen who need Ore at all are buying only as their immediate necessities require, and they say that this will be their policy this year unless there is a very decided change in the Pig Iron market. Many of them are at present using Ore contracted for almost a year ago at a price much higher than that now current for the same Ores. No definite price has as yet been fixed by the Ore companies, but the supposition is that it will be \$8 @ \$8.50, delivered on the dock at Cleveland.

Pig Iron.—There has been a good deal more inquiry during the past week, with a fair volume of business. A firmer feeling obtains, although prices remain unchanged. Orders for Finished Iron are coming more freely. Mills generally have small stocks of the raw article, and as the production is being rapidly reduced by the blowing out of so many furnaces, and the consumption is increasing, there is a feeling of apprehension on the part of consumers that prices might possibly go up 50¢ @ \$1 1/2 ton. We know that some furnaces are refusing to make additional sales at prices they accepted a few weeks ago, and the market may be reported steady at following quotations:

No. 1 Foundry.....\$22.50 @ 23.00, 4 mos.
No. 2.....20.50 @ 21.50, 4 "
Gray Forge.....19.00 @ 20.00, 4 "
Bessemer Iron.....22.50 @ 23.00, 4 "
Coal Blast Charcoal.....30.00 @ 35.00, 4 "

We can report sales of Gray Forge at \$19.50 cash, and \$20, 4 months; Bessemer at \$22.50, 4 months, which may be regarded as the lowest for good brands.

Muck Bar.—There is no demand, and in the absence of sales we quote nominally at \$35 @ \$36, cash, at mill, for good Neutral mixtures.

Manufactured Iron.—Manufacturers generally report an increased inquiry; some of them are already pretty well supplied with orders, and it looks as if they would all be in the same condition before long. For well-assorted orders 2¢ is the ruling price. It is confidently expected that the stoppage of several large mills west of here will cause a large proportion of their trade to come to Pittsburgh.

Nails.—There is not much doing just now, but manufacturers look for at least a fair spring business, which usually opens the latter part of this month. The factories, after a stoppage of two weeks, will be started up next Monday. Prices remain unchanged at \$3.40, 60 days, 2¢ off for cash, with the usual abatement of 10¢ per keg on carload lots and upward.

Wrought Iron Pipe.—There is a fair business and prices are steady as quoted. But few, if any, manufacturers are willing to contract for future delivery at present rates. Discount on Gas and Steam Pipe, 70 @ 70 1/2¢; on Boiler Tubes, 55¢ off; Oil Well Casing, 50¢ per foot, net; do. Tubing, 15¢ @ 16¢.

Old Rails.—There is more inquiry, and prices are firmer, with diminished offerings. American Tees are offered at \$26.50, with \$26 bid. We can report a sale of 500 tons Double Heads at equal to \$25.50 in Pittsburgh, which is considerably less than they can be laid down here from the seaboard.

Steel Rails.—There is a much firmer feeling, and while we have heard of no sales above \$40, cash, at mill, some of the mills are now asking \$41, and refuse to sell for less. The mills hereabout are sold from four to five months ahead. The Edgar Thomson Works are now making shipments by river to New Orleans.

Steel.—There is an increasing inquiry for Merchant Steel, and some of our mills are pretty well employed. No change in prices. There is considerable cutting in the lower grades, which for many purposes are taking the place of Iron.

Railway Track Supplies.—There is an increasing demand for Railway Spikes; some concern reports having booked orders for some 8000 kegs during the past week. Price unchanged at 2 1/4¢ @ 3¢; Splice Bars, 2.20¢ @ 2.25¢; Track Bolts, 3.50¢ with Square and 3.60¢ @ 3.65¢ with Hexagon Nuts.

Crop Ends.—There have been no sales reported since our last, in the absence of which we continue to quote at \$25.

Scrap.—Continues dull, but dealers look for an increased business within the next week or two. Wrought Scrap is still quoted nominally at \$25 @ \$26 1/2 net ton for Ordinary and \$27 for Selected; Wrought Turnings, \$17 @ \$19; Car Axles, \$35 @ \$38; Old Car Wheels, \$23 @ \$23.50 1/2 gross ton; Cast Borings, \$13.50 @ \$14. There is not enough doing in any of the above articles to establish prices.

Coke.—Some makers report an improved trade, but, upon the whole, business is by no means brisk, although the natural effect of the reduced cost will be to increase consumption. We continue to quote at \$1.05 1/2 ton, free on cars at ovens.

Window Glass.—Is reported very unsatisfactory, but makers are hopeful of an early improvement, both as regards demand and price.

CHICAGO.

Office of The Iron Age, 36 and 38 Clarke St., cor. Lake,
Chicago, March 12, 1883.

Hardware.—The inquiry for General Hardware continues good, and quotations remain unchanged.

Nails.—Nails are in good request, with fair stocks in dealers' hands. We quote tod. to 60d., \$3.40 @ \$3.50 1/2 keg, with the usual discount for cash.

Manufactured Iron.—The stocks of Merchant Iron in dealers' hands, owing to the increased demand during the past week, have been considerably reduced, so that the quantity of some of the commoner sizes on hand is small. Quotations remain firm and without any change. We quote: Bar Iron, 2.30¢ @ 2.40¢ rates; Angle Iron, 3.10¢ @ 3.30¢ rates; T Iron, 4¢ rates; Beams, 3.80¢; Channels, 3¢; Tank Iron, 3¢ @ 3.20¢ rates; Sheet Iron, 3.20¢ @ 3.40¢ rates; Norway Original Bars, 4 1/2¢ rates; Norway Re-rolled Bars, 5 1/2¢ rates; Ulster, 4 1/2¢ rates; Low Moor Iron, 8¢ rates; Nuts and Washers, 8¢ off list; Wrought Boat Spikes, 3 1/2¢ rates.

Pig Iron.—The market shows an improvement since our previous report. Quotations, as a rule, however, remain unchanged. Southern Coke Irons have advanced 50¢ @ \$1 1/2 ton. Scotch Imported remains unchanged at \$31 @ \$31.50, with but little inquiry. We quote Charcoal Pig, Nos. 1 and 2, \$24; No. 3, \$25, and Nos. 4, 5 and 6, \$26.50, 4 months; Briar Hill, \$25; Silvery Soft, \$23 @ \$24; Crane No. 1, \$27.50; No. 2, \$26.50; Hinnrod, \$24; Thomas, \$27.50 @ \$28; American Scotch, 24 @ \$25; Du Val, No. 1, \$24; No. 2, \$23; Fulton Notch, No. 2, \$22.50; No. 3, \$21.50. Imported Scotch, \$31 1/2 ton, cash. Southern Coke \$25.50. Calumet, \$23 @ \$23.50, 4 months.

Steel.—The inquiry for Tool, Machinery and Agricultural Steels is fair and market firm, with no change in prices. We quote as follows: Tool, 12¢; Machinery O. H., 5¢; Crucible Machinery, 7¢; Hammer, 2 inches and under, 8¢; over 2 inches, 9¢; Cast Spring, 6¢, and O. H. Spring, Tire and Sleigh Shoe, 5¢; Sheet, first, second and third quality, 12¢, 10 1/2¢ and 8 1/2¢ respectively; Crucible Plow, 6¢; Eagle Plow, 5¢; Iron Center Plow, 9 1/4¢, and Soft Steel Center Plow, 9 1/4¢; Cast Plow, 5¢; German Plow, 4 1/2¢.

Scrap Iron.—Market very dull, with no inquiry. The following are the purchasing prices paid by dealers: No. 1 Railroad Wrought Scrap, 1¢ net ton, \$22; No. 1 Country Wrought Scrap, 1¢ net ton, \$20; No. 1 Cast Scrap, 1¢ ton, \$17; No. 1 Stove Plate Scrap, 1¢ ton, \$11; Machine Shop Wrought Turnings, 1¢ ton, \$10; Cast Iron Borings, 5¢.

CHATTANOOGA.

Office of The Iron Age, Market and 8th Sts.,
Chattanooga, March 12, 1883.

With better weather the movement of heavy materials increases, and prices are correspondingly firmer. No articles in the list show any advance, and large lots go at shaded figures. Since the adjournment of Congress there is more disposition to do business, and the approach of spring stimulates some lines of trade. The weather has been favorable for outdoor work during the week. Early fruits are in bloom. The streams are full, and boating and lumbering are active.

Pig Iron.—There is no change in the situation, except that the settlement of the tariff has given assurances to those desiring supplies that they may do so on a basis not likely to be disturbed for several months at least. We hear of contracts for Forge Irons at \$16.50 @ \$17, but these are large lots. Small orders are filled, except to favored buyers, at quotations. We quote: No. 1 Foundry, \$22 @ \$23; No. 2 Foundry, \$20 @ \$21; Gray Forge, \$18 @ \$19; White and Mottled, \$16 @ \$18; Car-wheel Metal, \$28 @ \$30.

Ores.—We quote: 50¢ Brown Hematite, 1/2 ton, \$2 @ \$2.75; Red Fossil, \$2 @ \$2.25, delivered at furnace.

Miscellaneous Articles.—Old Rails are slow at about \$24 for ordinary lots. We quote Wrought Scrap, \$18 @ \$22; Cast Scrap, \$11 @ \$14; Old Wheels, nominal, \$24.

Nails.—Are strong at \$3.40, carload lots at mills, 60 days; 15¢ higher for small bills.

Manufactured Iron.—Bar mills continue on double turn, and report satisfactory business. We quote at \$2.40 and steady for large bills; Railroad Spikes, \$3.20; Track Bolts, \$3.75; Fish Plate, \$2.50.

Coal.—We quote: Fancy Lump, \$4; Common, \$3 @ \$3.50; run of mine to manufacturers, \$2.

Coke.—We quote: Furnace Coke, \$3 at point of consumption; Foundry, 10¢ @ 12¢ 1/2 bushel.

Steel and Iron Rails.—A few small lots have been placed for Pennsylvania mills at \$40 at mill. There is no demand here for Iron Bars, and the mill is closed for want of re-rolling contracts.

CLEVELAND.

Cleveland, Ohio, March 6, 1883.

The demoralization in the iron market which we noted in our last circular continued through February and was more complete. Prices of Pig Iron declined 50¢ @ \$1 1/2 ton, and the condition of the market, already serious enough, was aggravated by the uncertainty of the tariff legislation; by the floods, causing destruction of property and giving rise to fears of considerable damage to the growing wheat, and by several large failures in the iron trade. At times it has seemed as if there was no good whatever in the situation, and that it was "to hug a dear deceit," in the words of Sir Richard Steele, "to play upon the lute when we ought to be blowing the alarm trumpet." "Nero fiddled when Rome was burning," and it was said that the optimist who still saw something cheerful in the course of affairs was actuated by the same spirit of levity as Nero, and refused to see that ruin and disaster were threatened to the whole business community.

We cannot share in these gloomy forebodings, and we believe that we have good reasons for the faith that is within us. First and foremost, Congress has done much to relieve us from a great uncertainty. While the tariff bill which has just been passed is not as good a measure as would have been the Tariff Commission report enacted exactly as submitted, it is vastly better than no bill at all, for it will be satisfactory to the majority of Iron and Steel manufacturers, and we can feel a reasonable degree of certainty that the tariff question is settled for the next five or ten years, which is a great desideratum. The Iron interest owes a large debt of gratitude to Mr. H. W. Oliver for his intelligent work on the Commission and his earnest efforts at Washington to secure the passage of an equitable measure. In the great interest taken in the tariff question, it must not be forgotten that this bill likewise provides for a great relief from internal taxation. The internal revenue will be decreased about \$12,000,000 annually, and to those who believe that a rich Government means a poor people this will be a less source of congratulation than the settlement of the tariff. The consequent less rapid progress in the Government debt reduction assures a longer lease of life to the present national banking system, and thereby a needed delay for the devising of an efficient substitute for the same, which, it is unnecessary to add, will require our best financial ability and far-seeing statesmanship.

The stock of Anthracite and Bituminous Pig Iron on hand January 1st, as reported by Mr. Swank, was 236,000 gross tons. This is not more than 18 days' stock—surely not an alarming quantity. Should the present depression continue, a stop of three weeks would cure the trouble. Already there has been a considerable curtailment of production since the first of the year.

We find great comfort in our foreign trade movement. From February to October, 1882, the balance of trade was for each and every month against us. In October the tide began to turn in our favor, and for the four months of October, November and December, 1882, and January, 1883, the balance in our favor amounted to \$95,000,000. At this rate we may hope for as favorable a balance this year as we had in 1880 and 1881.

The balance in our favor for the whole of 1880 was \$192,000,000, and for the whole of 1881, \$163,000,000. There is every reason to believe that our exports will be very large from now to July 1st. The largest movement so far has been in Cotton. The export of Wheat (including Flour reduced to Wheat) from July 1st, 1882, to February 1st, 1883, was 107,250,000 bushels. Unless Wheat should rule too high in price from speculative operations, it is estimated by the *Financial Chronicle* that our exports of Wheat from February 1st to July 1st will be \$2,000,000,000. The export of Corn from last year's crop only began in January, and from the damage this winter to the growing crops in Europe it is almost certain that Europe will take all of our surplus grain at good prices.

Railroad earnings should be a fair index of this country's prosperity. Earnings of 61 reporting roads for January show an increase of 7 per cent. over the same month of last year. The Pennsylvania Railroad, which, from its variety of traffic, is a better pulse of the country's condition than any other corporation, had larger gross and larger net earnings in January of this year than for the same month in 11 years.

While the present outlook in the iron market is not a rosy one, we believe that the vast majority of iron manufacturers are financially sound. There has been an over-production, but this trouble will gradually be overcome. The trade will adjust itself to the new era of lower prices, and while there remains, as at present, a sound basis to the business of the country, we are justified in believing that before long there will be some improvement in the iron market.

Yours truly, RHODES & CO.

LOUISVILLE.

GEO. H. HULL & CO., Commission Merchants, report to us as follows, under date of March 10, 1883: The settling of the tariff question seems to have had a good effect on iron. Inquiries are coming in quite freely. Prices are still without change. We quote for cash, in round lots, as below:

FOUNDRY IRON.
No. 1 Hanging Rock Charcoal.....\$25.50 @ 26.00
No. 1 Southern Charcoal.....22.00 @ 21.00
No. 1 Hanging Rock Stonecoal and Coke.....21.50 @ 22.00
No. 1 Southern Stonecoal and Coke.....21.50 @ 22.50
No. 2 Southern Stonecoal and Coke.....20.50 @ 21.00
"American Scotch".....21.00 @ 22.00
Open Silver-gray.....20.00 @ 20.50
Close Silver-gray.....19.00 @ 19.50

MILL IRON.
No. 1 Charcoal.....20.50 @ 21.00
No. 1 Stonecoal and Coke, Neutral.....19.50 @ 20.00
No. 2 Stonecoal and Coke, Neutral.....18.50 @ 19.00
No. 1 Stonecoal and Coke, Cold-short.....17.50 @ 18.00
No. 2 Stonecoal and Coke, Cold-short.....17.00 @ 17.50
White and Mottled, Cold-short and Neutral.....16.50 @ 17.00

CAR WHEEL IRON.
Hanging Rock, Cold-blast.....32.00 @ 32.00
Hanging Rock, Warm blast.....25.00 @ 25.00
Alabama and Georgia, Warm and Cold-blast.....25.00 @ 25.00
Central Kentucky, Cold-blast.....25.00 @ 25.00

W. B. BELKNAP & CO., Iron and Steel Merchants, No. 115 to 121 West Main street, report to us as follows, under date of March 10, 1883: Bar Iron has improved materially during the past week. Demand is better, and those mills which furnished the extreme low quotations of February have withdrawn such, and now ask from \$2 to \$3 1/2 ton advances. Deliveries are unusually slow, indicating no accumulation of stock. We quote here 2.20¢ @ 2.30¢ as a close range of price. Retail sales and small lots bring a higher figure. Sheet is low, but prices very firm. Manufacturers, as a rule, are declining to book at present rates for summer delivery. Some large sales have been effected at bottom figures. The outlook in this line is good—to 14 at 3.10¢ @ 3.20¢ 26 and 27, 4¢ @ 4.20¢. Nails are in good supply, but are held well up to manufacturers' card, freight added. The demand for several days has been heavy, and all buyers call for immediate delivery. Eastern mills have approached the market, but offer

no special inducements. Price from store \$3.50, with slight discount on larger lots. General trade is much improved. Flow stock and fence material are extremely active. Factories here are running overtime. Encouraging signs are visible everywhere. With the continuance of favorable weather, we bespeak a satisfactory season for the Hardware jobbers and manufacturers alike.

ST. LOUIS.

HOFFER & CO., Pig Iron and Iron Ore Merchants, 417 Pine street, report to us as follows, under date of March 10, 1883: There is a slight increase in demand, but very little indication of a large business. Prices remain about the same as when last reported, and we therefore do not change quotations:

HOT BLAST CHARCOAL IRON.
Missouri.....\$21.00 @ 22.00
Southern.....20.00 @ 21.00
Ohio.....20.00 @ 21.00
COAL AND COKE IRON.
Missouri.....\$21.00 @ 22.00
Southern.....20.00 @ 21.00
Ohio.....20.00 @ 21.00
MILL IRON.
Red Short.....\$10.00 @ 11.00
Neutral.....10.00 @ 11.00
CAR WHEEL AND MALLEABLE IRON.
Missouri.....\$24.00 @ 25.00
Southern.....23.00 @ 24.00
Ohio.....23.00 @ 24.00

BALTIMORE.

W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, reports us the following, under date of March 12, 1883: Trade for the past week has ruled moderately fair, and with more inquiry, indicating increased business with the incoming spring. I think values have now reached bottom, and quote same firm as follows:

Ref. Bar Iron, 1 to 6 x 3/4 to 1, 7 1/2¢ @ 8 1/2¢
" " 1 to 4 x 1/2 to 1, 7 1/2¢ @ 8 1/2¢
" " 1 to 2 x 1/2 to 1, 7 1/2¢ @ 8 1/2¢
" " 1 to 1 x 1/2 to 1, 7 1/2¢ @ 8 1/2¢
" " 1 to 1 x 1/2 to 1, 7 1/2¢ @ 8 1/2¢
" " 1 to 1 x 1/2 to 1, 7 1/2¢ @ 8 1/2¢
" " 1 to 1 x 1/2 to 1, 7 1/2¢ @ 8 1/2¢
" " 1 to 1 x 1/2 to 1, 7 1/2¢ @ 8 1/2¢
" " 1 to 1 x 1/2 to 1, 7 1/2¢ @ 8 1/2¢
" " 1 to 1 x 1/2 to 1, 7 1/2¢ @ 8 1/2¢

RICHMOND.

ASA SNYDER, Iron Merchant and Furnace Agent, writes as follows, under date of March 12, 1883: Our iron market continues steady, and gives promise of increased activity. With a few exceptions, the quotations of the past week fairly represent the present.

No. 1 Scotch Pig Iron.....\$24.00 @ 25.00
No. 1 Anthracite Pig Iron.....24.00 @ 25.00
No. 2.....22.00 @ 23.00
No. 1 Virginia Coke Pig Iron.....22.50 @ 23.50
No. 2.....21.00 @ 22.00
No. 1.....20.00 @ 21.00
White and Mottled.....18.00 @ 19.00
Virginia C. R. Charcoal.....27.00 @ 28.00
Old Dom. Nails (carload lots).....3.00 @ 3.50
Old Rails.....25.00 @ 26.00
Old Wheels.....19.00 @ 20.00
Wrought Scrap, No. 1.....19.00 @ 20.00
Cast Scrap, No. 1.....18.00 @ 19.00
Richmond Refined Bar Iron.....2.40 @ 2.50
Horse Shoes (Frederick).....4.00 @ 4.50
Mule.....3.50 @ 4.00

SAN FRANCISCO.

J. W. HARRISON, Coal and Metal Broker, 204 California street, reports as follows, under date of March 3, 1883: Pig Iron.—No change in prices, although the quantity being consumed is increasing, but there is a full stock on hand among consumers; that, in addition to considerable *en route*, and the probable starting of the Clipper Gap Furnace in May, tends to depress prices:

To arrive. Spot.
Eslington.....\$25.00 7.50 \$7.50 per ton.
Glenbrook.....27.50 7.75 " "
Shore N. 1.....27.50 8.00 " "
Clay Lane, White.....21.00 7.75 " "
American Hot.....31.00 12.00 " "

Coal.—Excepting a few sales of Australian Coals, Bulli and Wallsend, there are no others to note; these have been made at full figures. Last week there was a disposition to lower prices for loading, but the then asking prices are readily obtainable now. The weather favors an advance, as importations for the next three months must necessarily be light, there being so little *en route*, and the present inducements for an influx of vessels later in the season are not very bright. Prices, cargo lots, are as follows:

To arrive. Spot.
Australian.....\$7.50 7.50 \$7.50 per ton.
Liverpool steam.....7.50 7.75 " "
West Hartley.....7.75 8.00 " "
Scott Spintire.....7.50 7.75 " "
Cardiff.....7.50 7.75 " "
Lehigh Lump.....13.50 13.75 " "
Cumberland, bulk.....11.25 11.50 " "
Egg Hard.....12.50 13.00 " "

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From Our Regular Correspondent.)

LONDON, Eng., Feb. 26, 1883.

THE OUTLOOK.

has undergone no modification or improvement since my last report. There is no animation in any quarter, and the universal complaint is that the orders in hand are being worked off far more rapidly than they are being replaced. There is no doubt that this is really the case—a sure sign being the uninterrupted, even if slow, declension of selling prices during the past two months. Under such circumstances it is becoming increasingly plain that the output is exceeding the consumptive wants of the time being, and that therefore the production must be lessened or there must be a further fall in values. Almost all sorts and conditions of iron and steel manufacturers declare that cheap production has already reached its ultimate point, so that the only alternative would appear to be a general shortening of sail in order to restrict the make. This, as we all know, sounds very feasible and appears easy on paper, but in reality is most difficult of embodiment. Everybody will freely admit the excess of

production and the necessity for restriction, but nobody is willing to begin the process, or to imitate himself for the good of his fellows. Voluntary restriction throughout the country is therefore scarcely possible. If the make be reduced, it will be by the operation of that hard-and-fast rule which ordains the survival of the fittest—*adieu* in this case the most wealthy. The little men must suffer and go to the wall, because neither their capital nor their skill is equal to the resistance of hard times. Failures will thin the ranks of the good men and true who cannot withstand the pinch of low prices, and the weeding out will be gradual. At present we have hardly arrived at the point necessary to produce these stoppages, but we are obviously gravitating in that direction, and shall reach the goal unless by some lucky chance a revival of the demand should set in. At the time of writing the outlook does not show any signs of such a revival, so that the ordinary British ironmaster is beginning to make up his mind for a "squeeze."

SOME CURRENT DIVIDENDS

seem to show that the results of last year's working were not wholly bad, and the reports of various companies bear testimony as to the largeness of the turnover. Palmer's Shipbuilding and Iron Co., of Jarrow, pay an interim dividend of 3½ per cent. for the half-year ending December 31, 1882; Samuel Fox & Co., Limited, Sheffield, pay an interim dividend of £4 per share (4 per cent.) for the same half-year; the Wigan Coal and Iron Co., Limited, made a net profit of £23,978, yielding a dividend of 2½ per cent. for the half-year; Vickers, Sons & Co., Limited, Sheffield, pay at the rate of 10 per cent. per annum, besides a bonus of 3½ per cent.; the Mersey Forge Co., pay at the rate of 5 per cent. per annum; the Clay Lane Iron Co. (formerly Thomas Vaughan & Co.), pay at the rate of 5 per cent. per annum, allow 7½ per cent. for depreciation and carry forward £7000 to next account.

YOUR TARIFF DEBATES

are still being followed with great interest—a feeling not by any means devoid of anxiety in many quarters, seeing that the sudden defection of your support is universally recognized as being a prime cause of the prevalent dullness. The daily papers give us particulars each morning of the curious doings of your Senate and House, but the cross purposes of these two bodies have been so well played that the average British newspaper reader must be hopelessly mixed up in his endeavors to distinguish "t'other from which." Those who have followed the discussions more methodically and regularly are pretty well agreed that there is small prospect of any reductions likely to benefit the American export trade of Great Britain, in which view they are strongly supported by the latest news from Washington. It is plainly seen that the whole business is mainly a question of log-rolling or filibustering, and so long as the issues raised are to be settled in either of these ways, so long will the wealthy protectionist element retain command of your fiscal system. I believe there is an impression in the States that all our manufacturers earnestly wish that you should adopt free trade. That is not the case, as I have previously pointed out. The smelters and a few other classes of iron and steel men undoubtedly desire your abandonment of protectionism, but the sentiments of many other persons were well expressed the other evening during a discussion at the Society of Arts rooms by an implement manufacturer, who said he was afraid your people would shortly adopt free trade.

FORTHCOMING EXHIBITIONS

Exhibitions as a means of stimulating and extending business are evidently yet regarded with marked favor, judging from the number of such displays arranged for the coming spring, summer, &c. Among them will be those at Madrid, Amsterdam, Berlin, Lisbon, London, Zurich, Boston (Mass.), Vienna and Calcutta. That at Amsterdam will be very large and important, as also will be the Hygienic and Sanitary Exhibition at Berlin. The Madrid show will be interesting to all metallurgists, while that at Lisbon will be wholly agricultural. The London engineering, &c., exhibition will be large and varied, while the Vienna affair will be devoted to electricity. The Calcutta one will not open until next December, prior to which Mr. Joubert, its promoter, will visit the United States. In 1884 a great national exhibition will take place at Turin, and the next or succeeding year one will be held at Rome. The gigantic "international" affairs appear to be quite—and properly—played out in this country.

STEEL MAKING IN 1882.

I have just received a summary of the statistics of the British Iron Trade Association for 1882, showing the make, &c., of different kinds of steel in that year. The total production of Bessemer steel ingots in the United Kingdom is stated at 1,673,649 tons, an increase of 231,030 tons on the production of the previous year. Seventy-four per cent. of the ingots made were manufactured into Bessemer steel rails, against 70 per cent. in 1881 and 1880, the production of rails being 1,235,785 tons, an increase of 212,045 tons on that of 1881. The largest quantities of ingots were turned out in South Wales and Sheffield. The number of Bessemer converters at work during the year was 80, two less than in 1881, the average output per converter having increased from 17,582 tons to 20,920 tons. In 1879 the average yield per converter was only 12,641 tons. The best result obtained during 1882 was a make of 75,202, with two converters. The make of "open-hearth" steel was 436,000 tons, against 338,000 tons in 1881. Scotland is the chief seat of this industry, the production of the Scotch open-hearth works having been more than doubled during 1882, as compared with that of the previous year. On January 1, 1883, there were 1,082,487 tons of steel, iron and wooden shipping in process of construction, or about to be built, in the United Kingdom, 182,116 tons less than on January 1, 1882. If my memory serves me I think the foregoing figures show that we have once more gained the lead in Bessemer working, with an output for 1882 considerably ahead of that of the United States.

SCOTCH PIG IRON

has been "dead as ditch water" during the week, the range of warrants very well demonstrating the utter lack of animation in the open market, thus: 19th, 47/8 @ 47/6½; 20th, 47/7 @ 47/3½; 21st, 47/4 @ 47/3½; 22d, 47/4 @ 47/5½, and 23d, 47/6 @ 47/3. In makers' brands there have been few changes, and those mostly in a downward direction. Virtually, however, named brands are unaltered. There are now 112 furnaces at work in Scotland, as against 108 a year ago. In Connal's stores there are 593,273 tons (a decrease last week of 2101 tons), against 631,145 tons this date 1882, and 637,526 tons at midsummer last. Shipments to date are 4093 tons ahead of those for the same period of 1882, or a total this year of 46,191 tons foreign and 72,721 tons coastwise. The importations into Scotland from Middleboro' to date have been 29,356 tons, or 18,324 tons below those of 1882. At some of the Scotch furnaces a grade of iron is being made to compete with Cleveland pig. It is called "No. 4," and is priced as under at present: Summerlee, 55/; Chapelhall, 55/6; Quarter, 47/6; Monkland, 47/6; Eglinton, 49/; Dalmellington, 49/6; Kinnell, 50/; all free alongside ship. Writing from Glasgow on February 24, James Watson & Co. said: "The Scotch iron market has been flat during the past week, and the amount of business continues very restricted. The demand for shipping brands is quiet, but quotations remain steady. The Middleboro' market is again weaker, makers having accepted as low as 40/ for No. 3, and the shipments so far this month show a heavy decrease. The warrant market here opened last Monday at 47/8 and receded to 47/6½. On Tuesday a small business was done from 47/7 to 47/4½, cash. On Wednesday the market was depressed, with transactions from 47/4½ to 47/1½, rallying in the afternoon to 47/3½. Yesterday the price further improved from 47/4 to 47/5½, relapsing to-day from 47/6 to 47/3, and closing buyers at the latter figure, sellers near. The shipments last week were 8887 tons, as compared with 10,933 tons for the corresponding week of last year." We quote:

	No. 1.	No. 2.	No. 3.
G. M. B., at Glasgow	49/	47/6	47/6
Clyde	52/	50/	49/6
Coltness	55/	53/	51/6
Langloan	55/6	53/6	51/6
Garioch	53/	51/	50/
Summerlee	53/	51/	50/
Calder	52/6	50/6	49/6
Carbroe	51/	49/	48/6
Glenarnock, at Ardrossan	51/6	49/6	48/6
Eglinton	50/	48/	47/6
Dalmellington	50/6	48/6	47/6
Shotts, at Leth.	49/6	47/6	46/6
Kinnell, at Bo'ness	48/6	46/6	45/6
Carron, at Grangemouth	48/6	46/6	45/6

with extras, is quoted as under, f.o.b. Glasgow, less merchants' commission and usual discount for cash:

	Glasgow.	N. B.	Govan.
B.P.s	46/10	45/10	45/10
100 lbs.	7/10	7/10	7/10
Nail rods	6/10	6/10	6/10
Angle iron	7/10	7/10	7/10
Boiler plates	8/10	8/10	8/10
Ship plates	7/15	7/15	7/15

Bars of other brands are quoted at 48/10.

Extras.—Flat, Half-Round, Oval and Half-Oval.

	Per ton	Per ton	Per ton
5-16" wide, X	3/16	3/16	3/16
3/16" X	100/	100/	100/
7/16" X	60/	60/	60/
1" X	60/	60/	60/
1 1/4" X	60/	60/	60/
1 1/2" X	60/	60/	60/
1 3/4" X	60/	60/	60/
2" X	60/	60/	60/
2 1/4" X	60/	60/	60/
2 1/2" X	60/	60/	60/
2 3/4" X	60/	60/	60/
3" X	60/	60/	60/
3 1/4" X	60/	60/	60/
3 1/2" X	60/	60/	60/
3 3/4" X	60/	60/	60/
4" X	60/	60/	60/
4 1/4" X	60/	60/	60/
4 1/2" X	60/	60/	60/
4 3/4" X	60/	60/	60/
5" X	60/	60/	60/
5 1/4" X	60/	60/	60/
5 1/2" X	60/	60/	60/
5 3/4" X	60/	60/	60/
6" X	60/	60/	60/

Round, Square and Octagon.

	Per ton	Per ton	Per ton
1 1/2" to 1 3/4" in.	10/	10/	10/
1 3/4" to 2" in.	10/	10/	10/
2" to 2 1/4" in.	10/	10/	10/
2 1/4" to 2 1/2" in.	10/	10/	10/
2 1/2" to 2 3/4" in.	10/	10/	10/
2 3/4" to 3" in.	10/	10/	10/
3" to 3 1/4" in.	10/	10/	10/
3 1/4" to 3 1/2" in.	10/	10/	10/
3 1/2" to 3 3/4" in.	10/	10/	10/
3 3/4" to 4" in.	10/	10/	10/
4" to 4 1/4" in.	10/	10/	10/
4 1/4" to 4 1/2" in.	10/	10/	10/
4 1/2" to 4 3/4" in.	10/	10/	10/
4 3/4" to 5" in.	10/	10/	10/
5" to 5 1/4" in.	10/	10/	10/
5 1/4" to 5 1/2" in.	10/	10/	10/
5 1/2" to 5 3/4" in.	10/	10/	10/
5 3/4" to 6" in.	10/	10/	10/

MIDDLEBORO' PIG IRON

is steadily falling away in value—so much so indeed, that it is a difficult matter to state the actual minimum price of the day. For No. 3 foundry, 40/ has been accepted by second holders, although makers quote 41/, and assert that they will not follow the "bears" further. The demand is indifferent, and the shipping returns show a marked falling off, while stocks are again increasing. For G. M. B., f.o.b. at makers' wharves in the Tees, net cash, less 2½% discount, current quotations are:

	No. 1.	No. 2.	No. 3.
Cleator	57/6	57/6	57/6
Lonsdale	57/6	57/6	57/6
Workington	57/6	57/6	57/6
West Cumberland	57/6	57/6	57/6
Lowther	57/6	57/6	57/6
Moss Bay	57/6	57/6	57/6
Distington	57/6	57/6	57/6
Harrington	57/6	57/6	57/6
Solway	57/6	57/6	57/6
Maryport	57/6	57/6	57/6

Large buyers could readily shade these rates. There are now 50 (of 82) furnaces at work, making about 32,450 tons weekly. Last week's shipments included 7491 tons of pig iron and 4261 tons of steel rails. North of England hematite and Bessemer pigs, f.o.b. Cumberland ports, &c., are quoted:

	Ordinary.	Bessemer.
No. 1	54/0	54/0
No. 2	53/0	53/0
No. 3	52/0	52/0
No. 4	51/0	51/0
No. 5	50/0	50/0
No. 6	49/0	49/0
No. 7	48/0	48/0
No. 8	47/0	47/0
No. 9	46/0	46/0
No. 10	45/0	45/0
No. 11	44/0	44/0
No. 12	43/0	43/0
No. 13	42/0	42/0
No. 14	41/0	41/0
No. 15	40/0	40/0
No. 16	39/0	39/0
No. 17	38/0	38/0
No. 18	37/0	37/0
No. 19	36/0	36/0
No. 20	35/0	35/0
No. 21	34/0	34/0
No. 22	33/0	33/0
No. 23	32/0	32/0
No. 24	31/0	31/0
No. 25	30/0	30/0
No. 26	29/0	29/0
No. 27	28/0	28/0
No. 28	27/0	27/0
No. 29	26/0	26/0
No. 30	25/0	25/0
No. 31	24/0	24/0
No. 32	23/0	23/0
No. 33	22/0	22/0
No. 34	21/0	21/0
No. 35	20/0	20/0
No. 36	19/0	19/0
No. 37	18/0	18/0
No. 38	17/0	17/0
No. 39	16/0	16/0
No. 40	15/0	15/0
No. 41	14/0	14/0
No. 42	13/0	13/0
No. 43	12/0	12/0
No. 44	11/0	11/0
No. 45	10/0	10/0
No. 46	9/0	9/0
No. 47	8/0	8/0
No. 48	7/0	7/0
No. 49	6/0	6/0
No. 50	5/0	5/0
No. 51	4/0	4/0
No. 52	3/0	3/0
No. 53	2/0	2/0
No. 54	1/0	1/0
No. 55	0/0	0/0
No. 56	0/0	0/0
No. 57	0/0	0/0
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No. 77	0/0	0/0
No. 78	0/0	0/0
No. 79	0/0	0/0
No. 80	0/0	0/0
No. 81	0/0	0/0
No. 82	0/0	0/0

HEMATITE PIG IRON

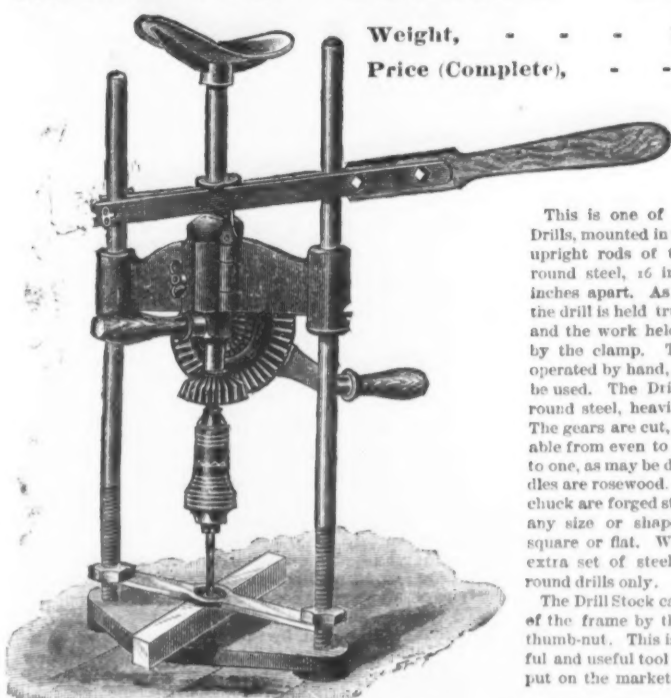
rules dull, without quotable change in the recently obtaining low quotations. For mixed parcels makers ask 52/ @ 53/, but lots of Nos. 1, 2 and 3, in usual proportions, have been sold at 50/ by holders anxious to realize. The demand is devoid of backbone, and there seems little likelihood of any marked alteration coming about in the near future. Makers' prices of West Coast brands are:

	No. 1.	No. 2.	No. 3.
Cleator	57/6	57/6	57/6
Lonsdale	57/6	57/6	57/6
Workington	57/6	57/6	57/6
West Cumberland	57/6	57/6	57/6
Lowther	57/6	57/6	57/6
Moss Bay	57/6	57/6	57/6
Distington	57/6	57/6	57/6
Harrington	57/6	57/6	57/6
Solway	57/6	57/6	57/6
Maryport	57/6	57/6	57/6

Large buyers could readily shade these rates. There are now 50 (of 82) furnaces at work, making about 32,450 tons weekly. Last week's shipments included 7491 tons of pig iron and 4261 tons of steel rails. North of England hematite and Bessemer pigs, f.o.b. Cumberland ports, &c., are quoted:

Large buyers could readily shade these rates. There are now 59 (of 82) furnaces at work, making about 32,450 tons weekly.	53/6	53/	52/
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MOUNTED BREAST DRILL.



Weight, - - - 13 Pounds.
Price (Complete), - - - \$6.

This is one of our best Breast Drills, mounted in a steel frame. The upright rods of the frame are 1/2 round steel, 16 inches high and 8 inches apart. As seen in the cut, the drill is held true by the frame, and the work held firmly in place by the clamp. The lever feed is operated by hand, or a weight may be used. The Drill Stock is of 5/8 round steel, heavily Nickel Plated. The gears are cut, and are changeable from even to a speed of three to one, as may be desired. The handles are rosewood. The Jaws of the chuck are forged steel, and will hold any size or shape shank, round, square or flat. We also put in an extra set of steel jaws for small round drills only.

The Drill Stock can be put in or out of the frame by the half-turn of a thumb-nut. This is the most beautiful and useful tool which has been put on the market for many years.

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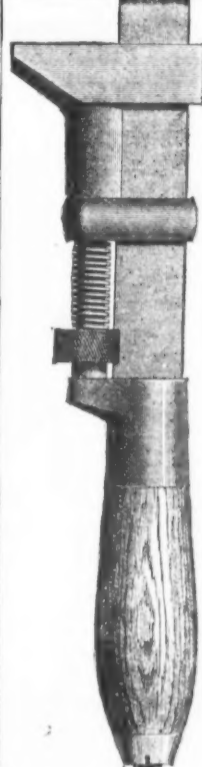
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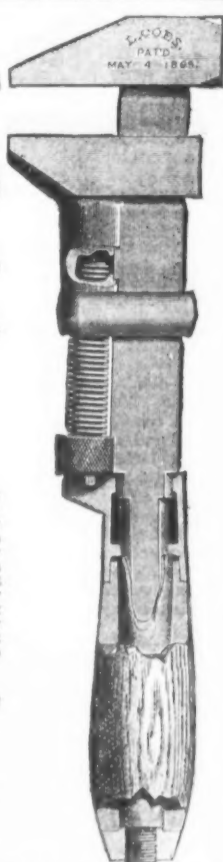


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PATENT
Screw Wrenches
MANUFACTURED BY
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Worcester, Mass.
ESTABLISHED IN 1830.



Our Genuine Wrenches are made with straight bars, full width and enlarged jaw, having ribs cast inside, which strengthen the jaw and give a full bearing on front of bar. These improvements, in combination with our new ferrule, made with double bearings, an iron tube, fitted to the shank and resting against the lower bearings, rigidly held in position by the handle and nut, effectually preventing back thrust of ferrule (see sectional view), verify our claim that we manufacture the heaviest and strongest Wrench in the market. Some genuine unless stamped.

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DURRIE & McCARTY,
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MANUFACTURED BY THE

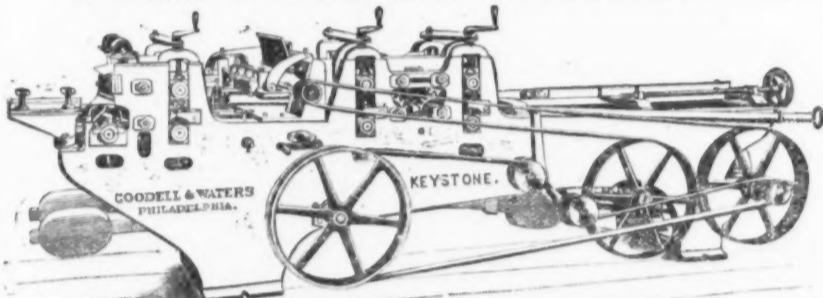
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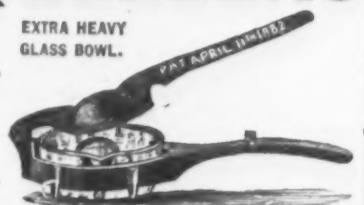
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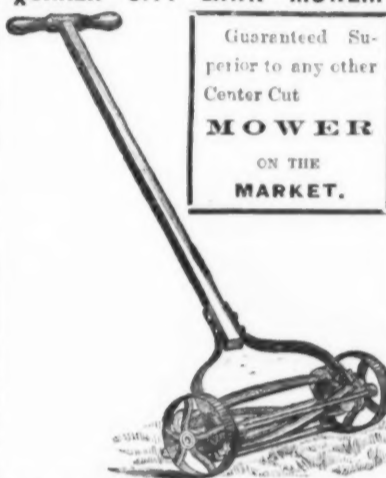


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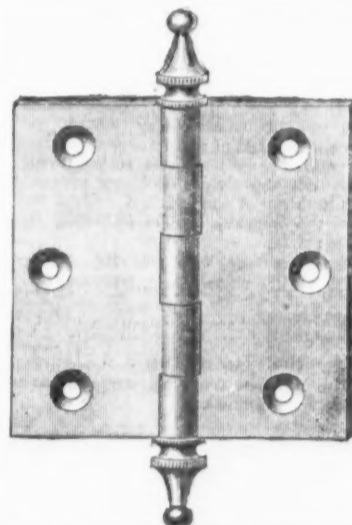
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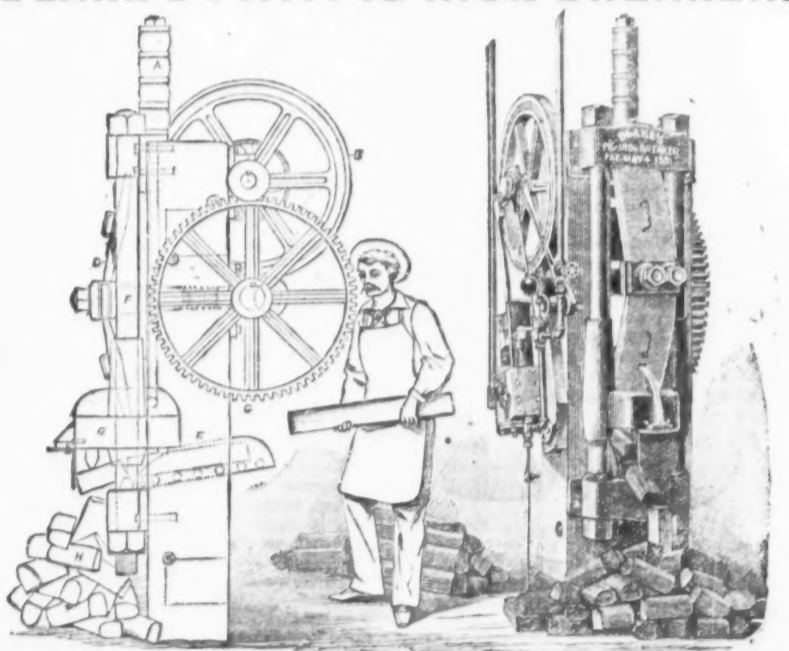
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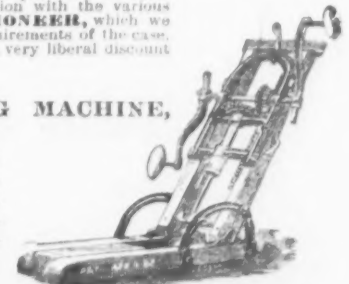
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Our improved

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with our improved adjustable crank, by which a greater or less leverage is obtained, enables us to offer a machine that will perform its work with less labor than any machine heretofore placed on the market.



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New Spinning Lathe.

In the manufacture of sheet-metal goods it has been found that much time can be saved in the production of cheap hollow or seamless ware, especially when made of tin plate, if the articles are first drawn to shape in a press and afterward finished in a lathe. The work of the lathe, therefore, is smoothing out the "body wrinkles" that are always formed in drawing work of this kind, and finishing the edges. The Ferracute Machine Co., of Bridgeton, N. J., have recently perfected a new spinning lathe, with trimming and wiring attachments, and which they claim embraces the latest improvements in machines of its kind. It is illustrated in Fig. 1 of the accompanying engravings, while Fig. 2 shows extra parts that can be obtained according to requirements. The frame is solid and heavy, with rounded corners, and supports a live head and a puppet on dead head, as in ordinary lathes. It also carries the special appurtenances for spinning, trimming or wiring the work. The usual shelf projecting from the bed to hold the rests is dispensed with in this machine, ample space being provided for the rests on the bed by throwing the spindle back of the center. This gives an unbroken outline to the frame, which greatly adds to the appearance, and

dimensions of this tool are as follows: Extreme length of bed, 52 inches; circle that will swing over bed, 24 inches; circle that will swing over rest and within trimming cutters, 21 inches. The speed of the lathe spindle varies from 180 to 500 revolutions per minute. The total weight of the machine is about 1,100 pounds. A larger size of the same device is made, weighing 3,500 pounds, and swings 32 inches over the rests.

The Relative Corrosion of Iron and Steel.

At a recent meeting of the Paris Academy of Sciences, M. Gruner read a paper describing some researches concerning the relative corrosion of cast iron, steel and soft iron. In his experiments M. Gruner suspended various plates in a frame by their four corners, and immersed them simultaneously in water acidulated with about 5 per cent. of sulphuric acid or sea water, or simply exposed them in moist air. It was found that in the latter case chrome steels were corroded very rapidly, while tungsten steels were affected less than carbon steels. Cast iron, even with manganese, was oxidized less than steel and soft iron, and white specular iron less than gray cast iron. Sea water, on the other hand, was found to at-

him traces of fires were to be seen on the sides thereof, and fragments of charcoal and wood in the debris, indicating the use of fire in assisting the action of wedges and in extracting the masses of copper. The melting point of copper is about 1935° C., which no doubt fused the small points of copper attached to the larger masses, which the quick perception of these aboriginal people noticed, and led them to utilize in casting. The artistic forms of copper implements, whether cast or hammered, cannot fail to impress the observer that a race of men existed in early times whose origin is enveloped in mystery, and whose skill rivals that of man of historic times, assisted by all the inventions of this mighty age of iron. Professor Lewis remarked that much the greater number of prehistoric copper hammers were evidently produced by hammering. He believed that archaeologists had generally adopted the opinion that the mound-builders were not an extinct people, but were the ancestors of existing tribes.

The Canadian Canal System.

According to the annual report of the Minister of Railways and Canals, says a Canadian contemporary, the River St. Lawrence, with the system of canals established on its course above Montreal, and the lakes Ontario, Erie, St. Clair, Huron and Superior, with connecting canals, affords a course of water communication extending from the Straits of Belle Isle to Duluth, at the head of Lake Superior, a distance of 2,384 miles. This is one of the longest stretches of inland navigation in the world. Should the proposed canal between Duluth and the Red River be made—and the Duluth people seem to be in earnest in the matter—it would give us unbroken communication by water with the Red River, Lake Winnipeg and the Saskatchewan and other rivers that have their sources at the foot hills of the Rocky Mountains. The aggregate length of the canals between Montreal and Lake Erie is over 70 miles, and the difference in elevation between Three Rivers, where tidal influence ceases, and Lake Superior, is about 600 feet. The canal system, as we at present have it, was commenced in 1841. Before that time the old Durham boats were in use, though many people, in going to the West, avoided the water altogether and took to the all-epoch route. In order to overcome all obstacles to the navigation of the St. Lawrence the first steps were taken by the Imperial authorities, and the prosecution of the work afterward became part of the duty of the Canadian Government. We find that, since the beginning of this work, the following amounts, omitting cents, have been expended:

Lachine Canal.....	\$8,163,718
Beauharnois Canal.....	1,024,632
Cornwall Canal.....	2,422,519
St. Lawrence Canal.....	117,821
Williamsburgh Canal.....	1,326,312
Chain vessel, &c.....	94,673
Surveys, &c.....	142,730
Welland Canal.....	20,359,361
St. Anne's Locks.....	339,212
Carlton and Grenville Canals.....	2,885,853
Culbute Locks.....	312,577
Rideau Canal.....	4,132,020
Chambly Canal.....	618,745
St. Peter's Canal.....	585,747
Surrey Lake Verte Canal.....	9,092

These items amount to a total of about \$43,418,600. This represents a considerable portion of the public debt of the country, thereby showing that our money has been largely spent on works of value to the people, works without which we could not have well carried on our inter-provincial trade. It was originally thought that the receipts from canal tolls and the use of water-power would go far toward the cost of maintenance. These expectations have not been realized, for we find that the simple ordinary expenses, to say nothing of the original outlay, far exceed the income, as the following figures show:

Construction during fiscal year 1882.....	\$1,631,785.67
Repairs during fiscal year.....	207,770.71
Maintenance during fiscal year.....	235,120.00

Total expenses.....\$1,874,676.47

Total receipts.....\$1,750,315.76

Expenditure over receipts.....\$124,360.71

The receipts from all our sources were made up as follows:

Welland Canal.....	\$110,744.07
St. Lawrence Canals.....	100,023.00
Chambly Canal.....	24,024.30
Rideau Canal.....	58,495.05
Rideau Locks.....	6,136.70
Burlington Bay Canal.....	3,557.00
Newcastle District Works.....	311.68
St. Peter's Canal.....	916.74
Total.....	\$304,014.40
Hydraulic rents.....	22,326.31

Grand total.....\$326,340.71

Thus, while our canals last year cost us over \$2,000,000, they gave us in return only \$326,340. In the face of these figures it may well be asked, Why should we continue to levy tolls? The amount that we draw in therefrom is but a trifle, as compared with the entire revenue of the Dominion. But, aside from this, it must be borne in mind that we have now to compete with the free canals of the State of New York for the carrying trade of the West. Montreal should have the bulk of that trade. Situated as it is, at the head of navigation and at the foot of inland navigation, we should control the traffic between the West and the sea. The natural channel to the ocean runs past our doors, while through New York the channel is an artificial one, and much more costly and inconvenient than ours. Then why not sweep away the tolls at once, and have done with them? The revenue is nothing, as compared with the benefits that would follow the freeing of our canals. Not Montreal alone, but the whole of the western portion of the Dominion are interested in this important matter. It is to be hoped, therefore, that the Government will, before long, remove the tolls, and thus assist in bringing the trade of the West down the St. Lawrence.

The new steamer *Advance*, built for the United States and Brazil Steamship Co., has arrived in this city from the yards of Messrs. John Roach & Sons. The *Advance* is the second new vessel built for this line, and resembles the first one, the *Finance*, in every particular. Her dimensions are: Length,

317 feet; breadth, 38 feet 4 inches; depth of hold, 23 feet. She has a net tonnage of 1910 tons, or 2600 gross tons, and is supplied with every requisite for speed, safety and comfort in the shape of electric bells, steam-heaters and the most improved life-saving apparatus. She will be under the command of Captain Beers, who has been long on the route between here and Rio Janeiro. The *Advance* will make her first trip from this port Saturday next.

The Origin of the Steam Hammer.

Under the above head an English contemporary gives the following interesting account of the steam hammer:

Patricroft is the birthplace of the steam hammer, the invention of which marked the commencement of a new era in mechanical progress. The hammers previously in use were those called "tilt" or "helve" hammers, and these were worked either by steam, water or hand power. Helve hammers are even now in existence in some forges. The larger the object operated upon by such hammers, the lighter is the blow that is dealt, and conversely, the smaller the object the heavier the blow. The difficulty which presented itself to the mind of Mr. Nasmyth, of forging large masses of iron with such an imperfect tool, led to his invention of the "direct-action steam-hammer," which has played no unimportant part in the mechanical progress of this generation. It was in the early part of the year 1837 that the directors of the Great Western Steamship Company sent Mr. Francis Humphries, their engineer, to consult Mr. Nasmyth as to some engineering tools of unusual size and power, which were required for the construction of the engines of the steamship *Great Britain*. They had determined to construct those engines on the vertical trunk-engine principle, in accordance with Mr. Humphries' designs, and very complete works were erected by them at their Bristol dock-yard for the execution of the requisite machinery, the most important of the tools being supplied by Messrs. Nasmyth, Gaskell & Co. The engines were in hand when a difficulty arose with respect to the enormous paddle-shaft of the vessel, which was of such a size of forging as had never before been executed. Mr. Humphries applied to the largest engineering firms throughout the country for tenders of the price at which they would execute this part of the work, but, to his surprise and dismay, he found that not one of the firms he applied to would undertake so large a forging. In his dilemma he wrote to Mr. Nasmyth on the 24th of November, 1838, informing him of this unlooked-for difficulty. "I find," said he, "there is not a forge-hammer in England or Scotland powerful enough to forge the paddle-shaft of the engine for the *Great Britain*. What am I to do? Do you think I may dare to use cast iron?"

This letter immediately set Mr. Nasmyth thinking. How was it that existing hammers were incapable of forging a wrought-iron shaft of 30 inches diameter? Simply because of their want of compass, or range and fall, as well as power of blow. A few moments' rapid thought satisfied him that it was by rigidly adhering to the old traditional form of hand-hammer—of which the "tilt," though driven by steam, was but a modification—that the difficulty had arisen. When even the largest hammer was tilted up to its full height, its range was so small that when a piece of work of considerable size was placed on the anvil the hammer became "gagged," and on such an occasion, where the forging required the most powerful blow, it received next to no blow at all, the clear space for fall being almost entirely occupied by the work on the anvil. The obvious remedy was to invent some method by which a block of iron should be lifted to a sufficient height above the object on which it was desired to strike a blow, and let the block fall down upon the work—guiding it in its descent by such simple means as should give the required precision in the percussive action of the falling mass.

Following out this idea, Mr. Nasmyth at once sketched on paper his steam-hammer, having it clearly before his mind's eye a few minutes after receiving Mr. Humphries' letter narrating his unlooked-for difficulty, and by the same day's post the sketch of the invention by which Mr. Nasmyth proposed to forge the *Great Britain* paddle-shaft was sent to him, and he showed it to Mr. Brunel, the engineer-in-chief of the company, and to others, by all of whom it was heartily approved. The paddle-shaft was, however, never forged for the *Great Britain*. About that time the substitution of the screw for the paddle-wheel as a means of propulsion of steam vessels was attracting much attention, and the performances of the *Archimedes* were so successful as to induce Mr. Brunel to recommend his directors to adopt the new power. The great engines which Mr. Humphries had designed were accordingly set aside, so neither his great paddle-shaft nor Mr. Nasmyth's steam-hammer to forge it was any longer needed by him. In passing, we note that Mr. Wilson, who eventually played so important a part in the development of the steam-hammer, was the first to bring out the screw propeller in a practical form, namely, in 1828.

The hammer was left to bide its time until an opening for its utilization should appear. When in France, in April, 1840, and passing through the iron works at Creuzot, with M. Bourdon, the practical mechanic there, Mr. Nasmyth saw a crank axle of unusual size. He immediately asked, "How did you forge that shaft?" M. Bourdon's answer was, "Why, with your hammer, to be sure!" Great, indeed, was Mr. Nasmyth's surprise, for he had never yet seen the hammer, except in his own drawing. A little explanation soon cleared all up. Mr. Gaskell (Mr. Nasmyth's partner) had on a visit of M. Bourdon and Schneider to Patricroft, while he was away, shown, as an act of courtesy, Mr. Nasmyth's sketch of the hammer, and had considered the matter too trivial to be mentioned to him. M. Bourdon said he had been so much struck with the ingenuity and simplicity of the arrangement, that he had no sooner returned than he had a hammer made in general accordance with the design Mr. Gaskell

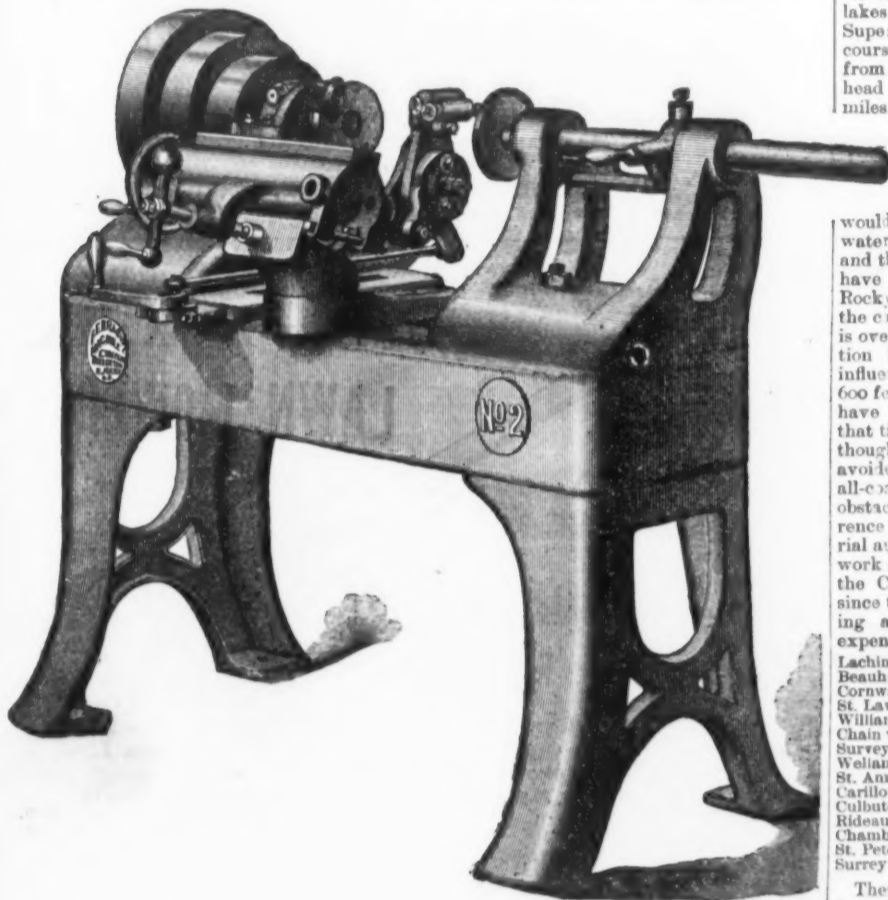
had shown him, and that its performance had answered his every expectation. Mr. Nasmyth was taken to see the hammer, and great was his delight to see the child of his brain in full and active work. He applied for a patent on January 9, 1842, which was secured, namely, at the end of 1842 or the beginning of 1843, when his first hammer was finished. It was a hammer of 30 cwt. falling weight, and was made for the Patricroft works. From the moment it commenced to work, the steam hammer became a recognized power in modern mechanics.

James Watt took out a patent, April 28, 1784, for "heavy hammers or stampers, for forging or stamping iron, copper or other metals, or other matters, without the intervention of rotation motions or wheels, by fixing the hammer or stamper to be so worked either directly to the piston or piston-rod of the engine;" and Mr. W. Deverell also took out a patent, June 6, 1806, in which he says: "This invention consists in giving motion to hammers, and various other contrivances for stamping," &c., and then he proceeds to state he "first causes steam to be raised in a boiler or steam vessel, as in the common way, having a steam cylinder with a piston and piston-rod in it, at the end of which is a hammer, either made fast to the rod by welding, or in any other proper way; the steam from the boiler or steam vessel, as aforesaid, is let in underneath the piston by means of an opening cock or valve, or cocks or valves; the air at the top of the piston will then be compressed by the superior pressure of the steam underneath the piston; after the piston has been raised to a given height there will be an opening made from the under side of the piston and a vacuum formed, as in the common way, or otherwise the steam may be let out into the common air. The compressed air on the top of the piston will then force down the hammer with velocity equal to what it may be compressed."

Both these specifications unmistakably shadow forth the direct-action steam-hammer, but neither Watt nor Deverell appear to have carried their ideas on the subject into practical operation. Although these specifications existed, it is indisputable that Mr. Nasmyth's form of hammer was his own invention, and since the expiration of his patent, in 1856, a host of firms have adopted principles embodied in his make of hammer. The field for the usefulness of the steam-hammer, as at first put into practical form, was not large. It was then only applicable for massive forgings, the demand for which was then rare. In order that the idea of a hammer worked by the direct action of steam might be extended to the manufacture of all ranges of forging, from the smallest to the greatest, it was necessary that it should be workable at high speed and be self-acting. Nasmyth's first type of hammer had a valve motion which could only be worked by hand, and that with much labor. The utility of the machine was therefore much restricted. The conditions to be fulfilled by a self-acting apparatus were, that the height to which the hammer would rise should be capable of adjustment, in order to have complete command over the power of the blow, and that the instant the blow was struck the hammer should again rise, so that not only no loss of time should ensue, but that the heat in the mass of iron on the anvil might not be reduced nor carried off by the cold face of the hammer.

The peculiar difficulty of insuring a true automatic arrangement will be seen when it is considered that the instant of percussion must vary with almost every blow that is struck, for the piece on the anvil becomes thinner and thinner by each succeeding blow, and in flat bars a blow is first given on the flat side and then on the edge, the difference in the fall of the hammer in the two cases being oftentimes several inches; and, further, that the hammer must be under perfect control at all times. Mr. Wilson, the manager for Mr. Nasmyth, solved the problem in 1843. He invented a self-acting motion by the application of which hammers could be made capable of forging an Armstrong gun, or cracking a nut without breaking the kernel, and be under such complete control that while the top was descending with its greatest momentum, it could be arrested at any point with even greater ease than any instrument used by hand. The steam hammer was further improved by Mr. Wilson by the introduction in July, 1856, of his patent "balanced slide-valve," and in June, 1861, by his patent "double-acting hand-gear motion." By these steam can be admitted to the under side of the piston only, and so work single-acting, and be admitted to the top side of the piston also, when sharper or more powerful blows are required, and change from single to double action, and, vice versa, can be effected instantaneously and in the simplest manner, and the height of fall—and, therefore, force of blow—varied as required by the attendant at the handle by which the balanced slide-valve is moved. In May, 1862, Mr. Wilson designed and erected a small steam-hammer specially for working small steel, which requires a great speed. The hammer block was of wrought iron, and weighed, with the piston-rod, about 2 cwt. The hammer was fitted with the balanced valve, double-acting and with an entirely new self-acting motion, much simpler and less complicated than the original one, capable of striking 500 blows per minute with a precision and certainty of action truly astonishing. Although there are now in existence many able and ingenious makers of steam-hammers, including some on the Continent, all have learned something of the steam-hammer from the inventions of Messrs. Nasmyth & Wilson.

The latest English journals speak of "a great steel-rail order" just received by a Sheffield house from the Government of New South Wales, the quantity being 72,000 tons. The house referred to is understood to be that of Charles Cammell & Co. The price is stated at £5 per ton, free on board, and as deliveries are extended over four and one-half years, the quotation, though it looks low, is quite equal to what is being generally obtained at present, especially when the quantity is taken into consideration. The precise weight is said to be 72,695 tons of steel flange rails, 71½ pounds per yard.



New Spinning Lathe.—Fig. 1.—New Lathe, with Spinning, Trimming and Wiring Rests, Built by the Ferracute Machine Co., Bridgeton, N. J.

at the same time to simplicity of construction. The live head has a revolving spindle with a cone pulley upon it, and a screw thread and shoulder to receive the various chucks. This spindle is driven from a countershaft, which fastens to the ceiling above. The dead head has a sliding spindle with several holding disks, and a locking device to clamp the article to be spun against the live chuck. The spinning apparatus consists of a special slide-rest carrying a roller tool. The upper portion of it is arranged to revolve about a vertical stud in its base piece, in order that it may be set at various angles. This rest has a cylindrical slide, by which the tool can be swung to and from the work and moved endways at the same time by means of a hand-wheel and crank provided. Attached to this slide is an arm with a steel roller upon it, which is brought to bear against the work in the

tack cast iron more energetically than steel, especially so in the case of white specular iron. Tempered steel was less attacked than the same steel when annealed, and soft steel less than manganese steel or chrome steel. Acidulated water, like sea water, dissolved gray cast iron more rapidly than steel, but not white specular iron. In all of his experiments M. Gruner found that gray impure cast iron was most strongly attacked, the various results obtained agreeing with the experiments on the same subject made by Mallet in 1843.

Hammers of the Prehistoric Races.

At a recent meeting of the Academy of Natural Sciences, H. T. Cresson made a few remarks upon a hammer of native copper found in the Bohemian Mine, Michigan, by S. F. Peck. It exhibited a distinct laminar surface and structure caused by hammering pieces of native copper together while in a cold state, in which our aborigines living in districts north of Mexico seemed to have acquired great proficiency. This is shown by the numerous wedges, chisels, hammers and other implements found in the ancient mining pits of Keeweenaw Point, Lake Superior, and at Isle Royal, together with axes, spears and arrow points, ornaments, &c., in Ohio and throughout those sections of our country which at one time were inhabited by the mound-builders, a race of people whose remains indicate a state of advancement in the arts and manufactures superior to the savage nations who succeeded them. The speaker likewise called attention to the form of haft-hole in this hammer, before mentioned to the Academy in their session of February 6, 1883, as peculiar to the hammers pertaining to the Neolithic and later periods of the Eastern Continent. It is a very interesting fact that recent discoveries have shown upon various forms of copper implements, deposited in their burial places by the mound-builders, markings similar to those left by molds in the process of casting. It may therefore be supposed that these people were acquainted with the art of smelting copper, as well as that of hammering it. Professor Foster, in his "Prehistoric Races of the United States," mentions the fact that in a collection made by Mr. Perkins he saw copper implements of mound origin that bear well-defined traces of the mold. "It is impossible," he adds, "to infer, after a careful examination of the specimens, that the ridges have been left in the process of hammering or oxidation. The more I examine their arts and manufactures the stronger becomes my conviction that they were something more than a barbaric people." Colonel Whittlesey, in "Smithsonian Contributions to Knowledge for 1893," mentions that in all the pits examined by



Fig. 2.—Samples of Chucks for Use in this Lathe.

process of smoothing out the body wrinkles. The universal motion of the slide allows the roller to follow the surface of round work of any form. If preferred, the tool can be manipulated by means of a hand-lever provided with the machine instead of using the crank. This is an especial advantage on work that is curved, profiles, and is a feature original with this machine. Another new departure is placing the wire produced at the back of the lathe nearly under the trimming cutter instead of at the front. This gives the spinning rest more room to be set in various positions, and adds to the swing of the lathe. The trimming and wiring attachment is built in an improved form, and is so arranged that a simple motion of the hand-lever in front accomplishes both operations—that is, when it is swung from right to left, the trimming cutters come forward and do their work; when the motion is reversed, the wiring roller comes forward and the trimmers recede. Ample adjustment is provided for various sizes and shapes of work. The

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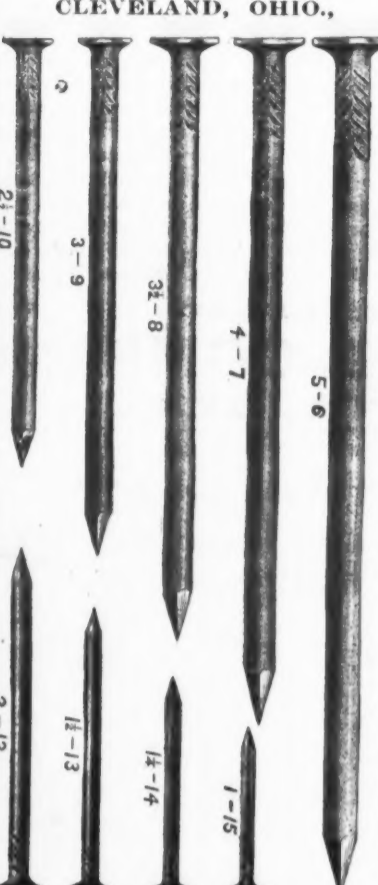
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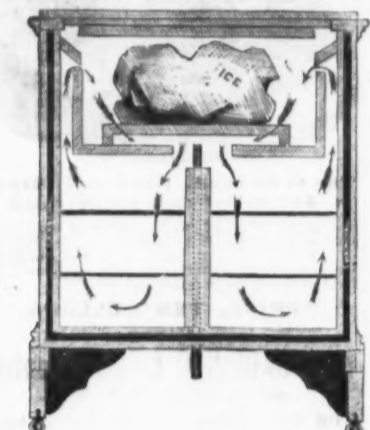
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A New Secondary Battery.

Secondary batteries are now rapidly multiplying in number, and among recent inventions in that direction we would mention a new form of battery proposed by Messrs. Liardet and Donnithorne, of London, England. The main features of the appliance, as stated by the inventors, are the intermixture of porous lead, deposited either by direct action by means of a galvanic current, or by the action of spelter with oxides and salts of lead, such as may be produced from galena or other lead ore, as the acting substance of the plates, to accumulate the current. This mixture is placed on very thin plates of pure lead, which serve as conductors, and is kept in position by porous plates. Great stress is laid upon the purity of the lead and lead compounds, as by this means the inventors seek to avoid local action and to increase the intensity and durability of the battery. An experimental set of cells recently tested consisted of 50 elements, each of which had an area of one-twelfth of a square foot, the weight of the set being 315 pounds. The cells, having been charged with a dynamo, are reported to have given a current of 12 amperes with an electro motive force of 95 volts. The inventors claim that they have produced a secondary battery or accumulator of half the weight, half the cost and nearly twice the power of any other.

The other day we received from an extensive manufacturing concern a catalogue, the modesty of which astonished us, for the artist had contrived to show on the last page an establishment with a frontage of 200 feet, an L 300 feet long on the side, and a furnace building of reasonable size beyond. How he managed to make them appear so nearly of a reasonable size we are unable to say, for we have noticed that whenever an establishment gets up a picture of this kind the artist usually spreads himself, so to speak, and gives us the impression that the buildings cover at least one county and hang over into some of those adjoining. Indeed, we call to mind several concerns having from three to five 15 x 20 shops, which the engravers have made to cover a territory nearly as large as the State of Connecticut. We certainly never before saw in a picture any works so small as in the catalogue referred to, and we submit that the firm in question ought to call in the edition and have a new cut made, or send out another cut to be pasted over the old one, in which the works should be properly expanded in appearance so as to cover the whole State. Just now, however, it occurs to us that possibly the size of the works on the ground and the size of the works in the picture bear an inverse ratio to each other. If this is the case the matter is explained, but it had never occurred to us before in just this light.

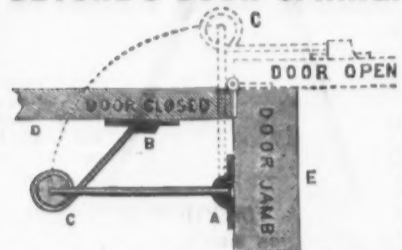


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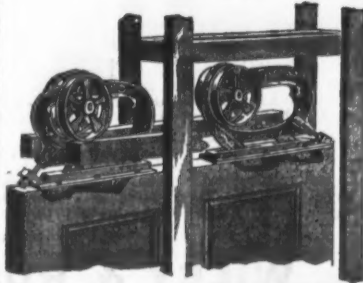
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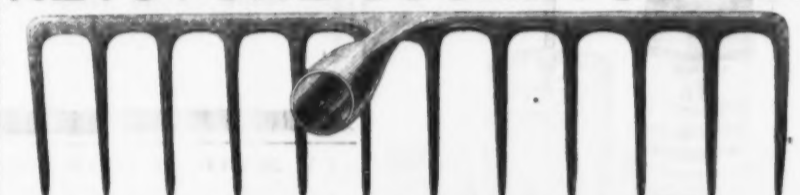
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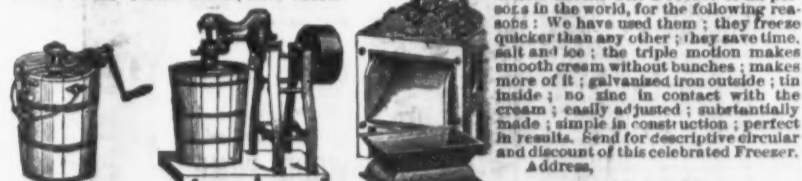
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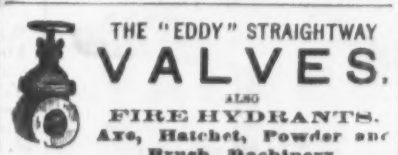
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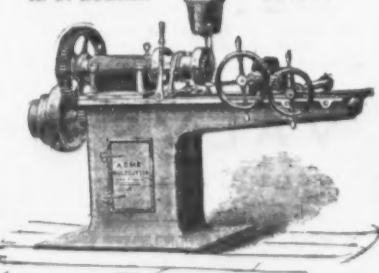
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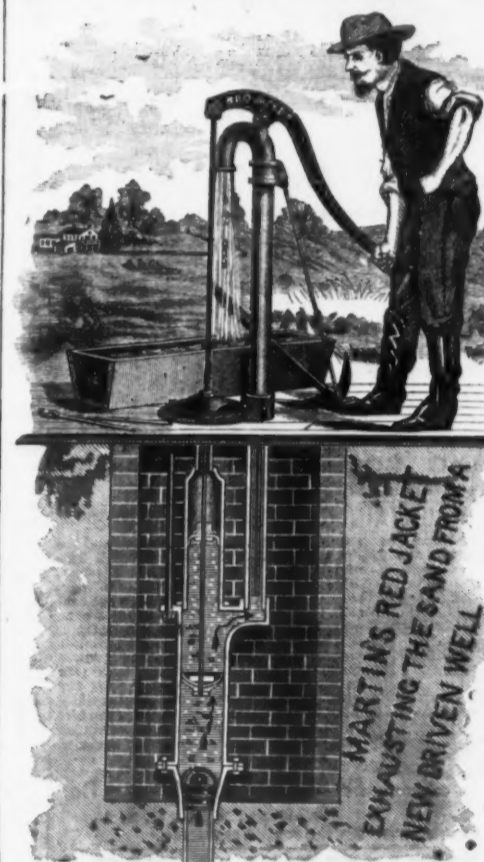
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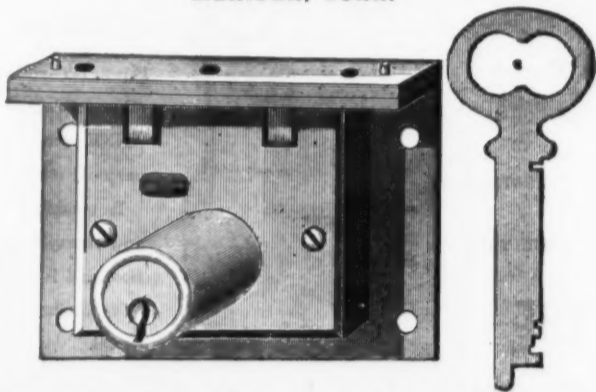
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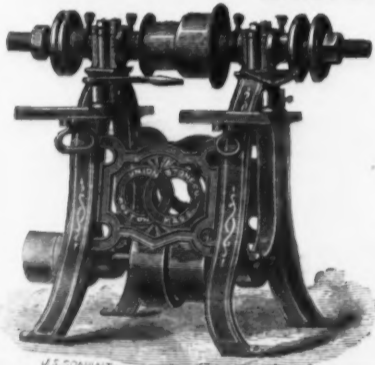
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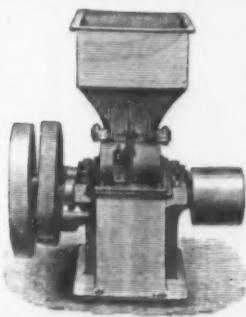
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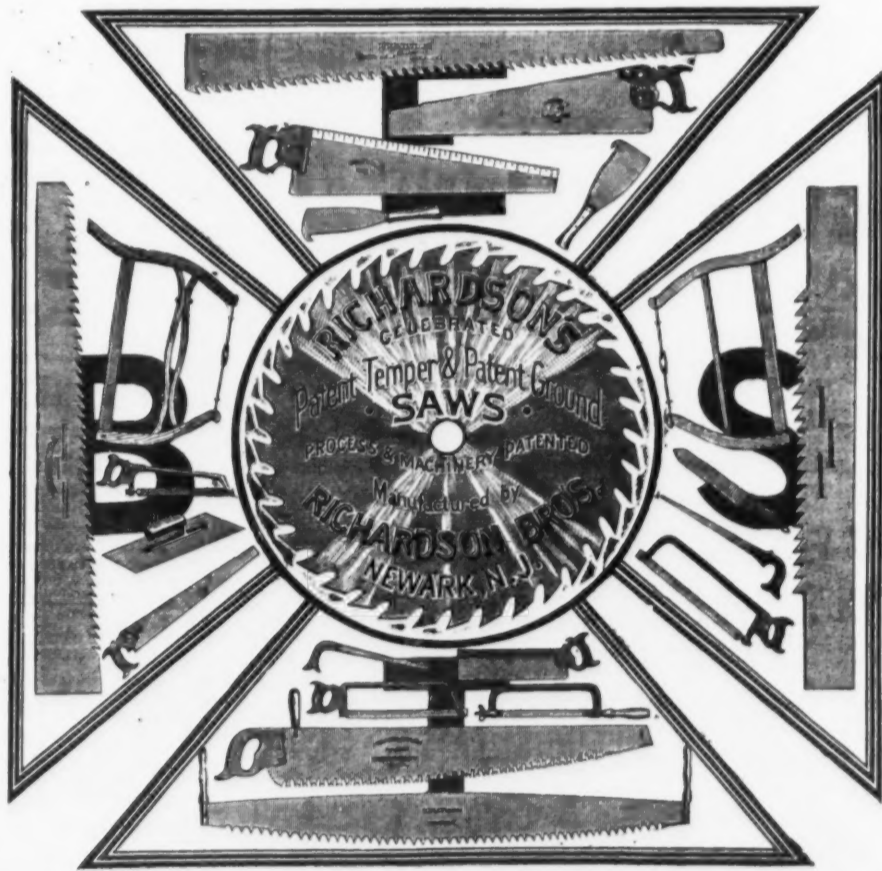
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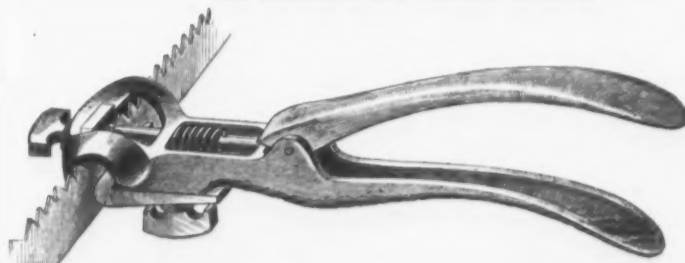
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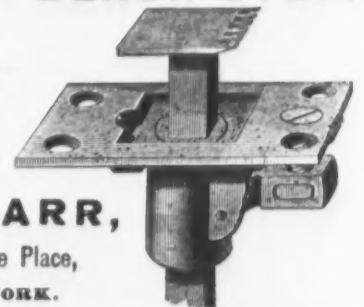
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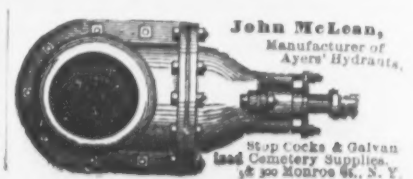
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Made from the Best Gray,
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This is not a Drawer Case. This structure has been
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The Standard of This Case is a Hollow Cone,
Firm as a Rock, on Which all
Shelves Revolve.

All Shelves can be taken off and replaced in a few
minutes.

The ornamental front frames of each Circle, well
protected, contain a piece of glass, whereby the deal-
er can see through all Compartments in a minute,
and if any number is out, can fill, or if not in stock,
can order, which in a Drawer Case makes a great
deal of trouble. The front frames can be taken out
and replaced by anyone in no time, thus making it
the most perfect structure ever placed upon the
market. With beauty and strength combined, it
surpasses even perfection in the highest state.

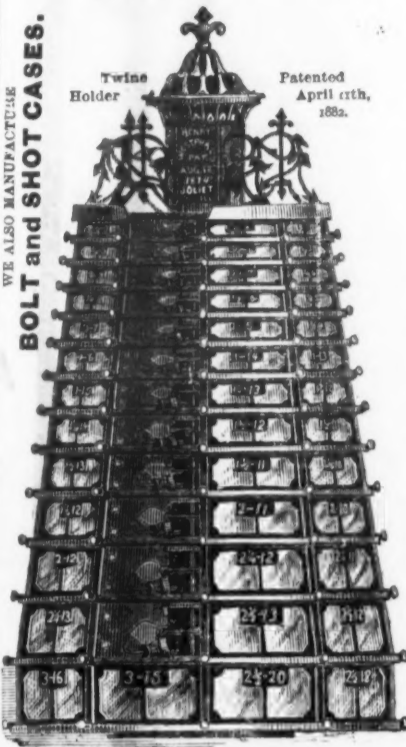
You have no drawers to take out or put back.
No mixing of screws by Customers helping them-
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shelves; or still worse, when standing on the
counter. No losing of Customers while looking
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In our case only one compartment is open at the
time and the balance all closed. No one can get
into the case except the men behind the counter.
Any number can be found instantaneously. By
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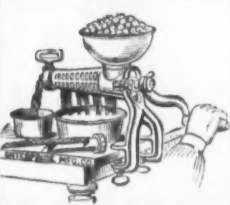

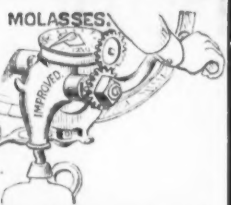


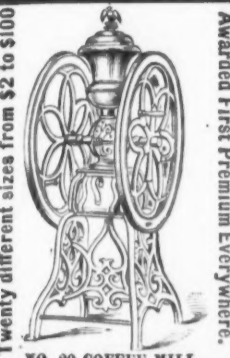
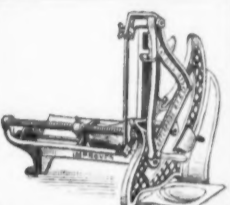
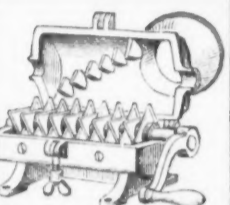

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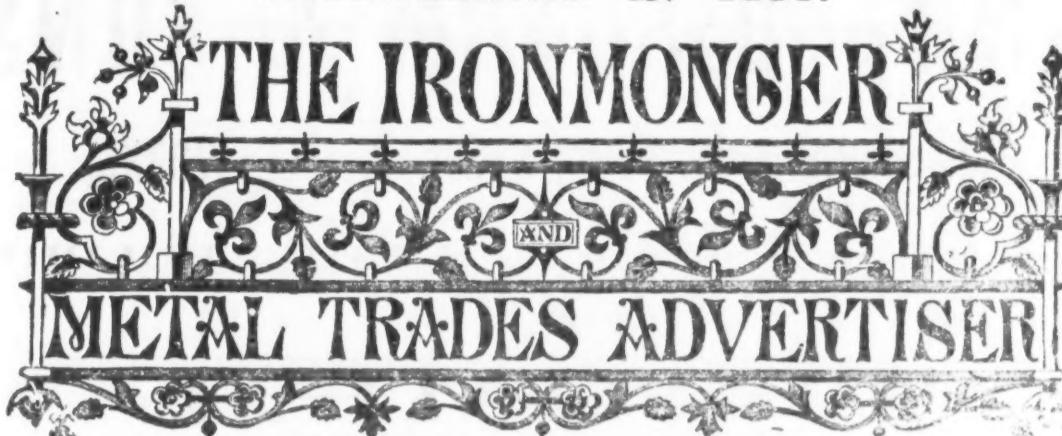
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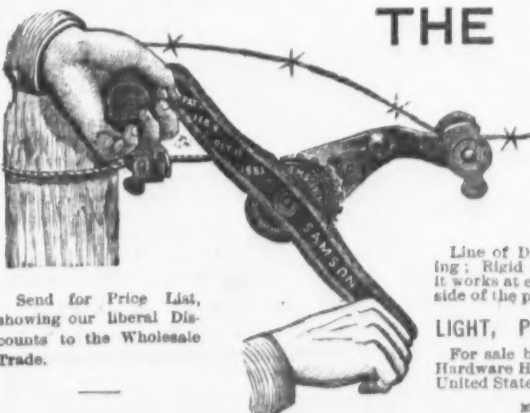
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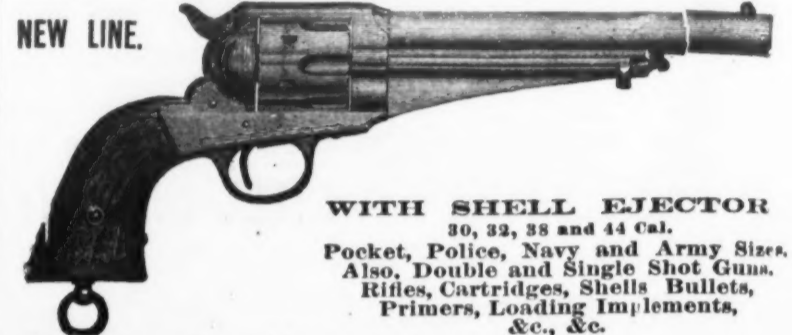
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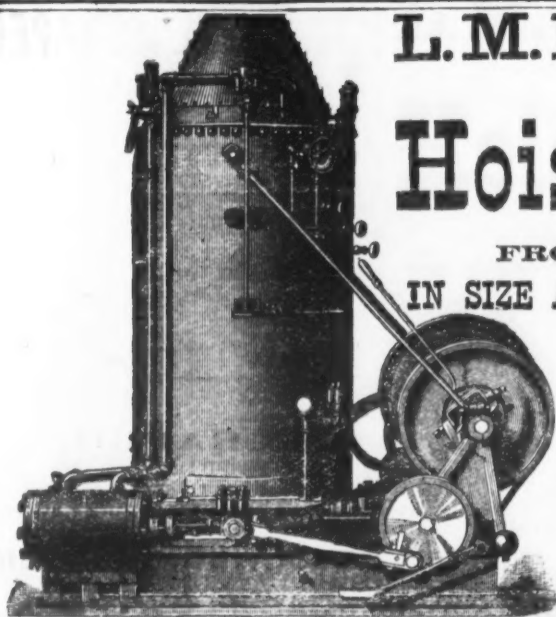
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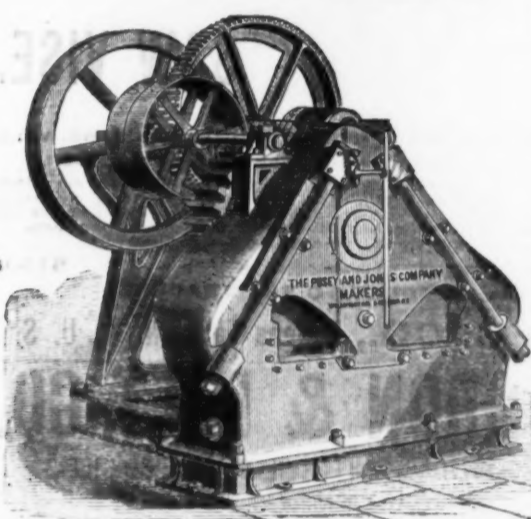
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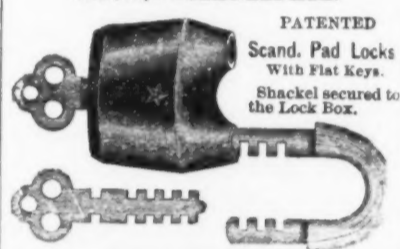
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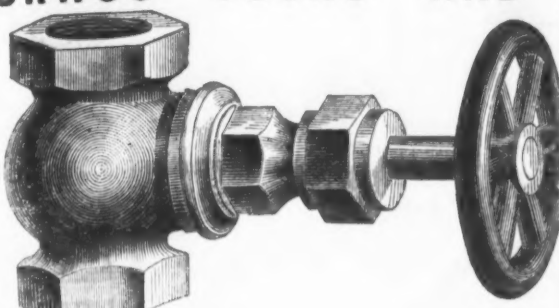
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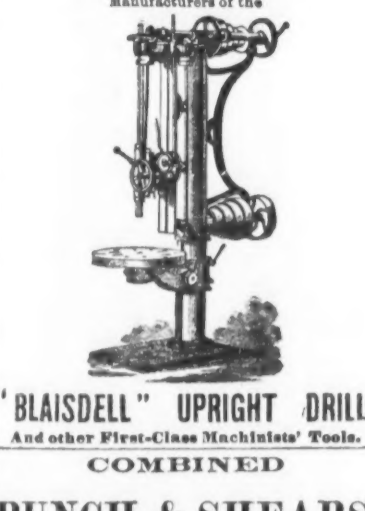
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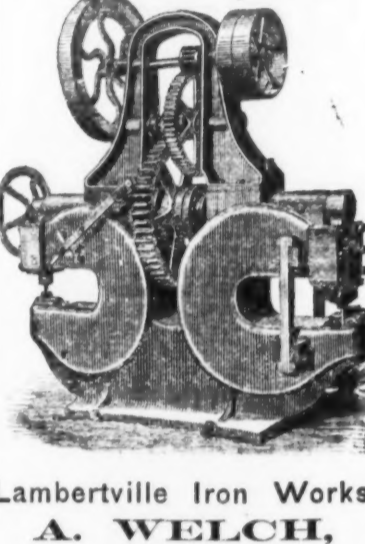
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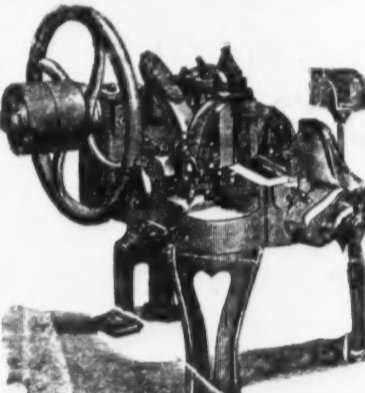
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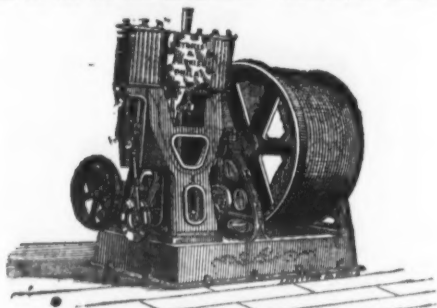
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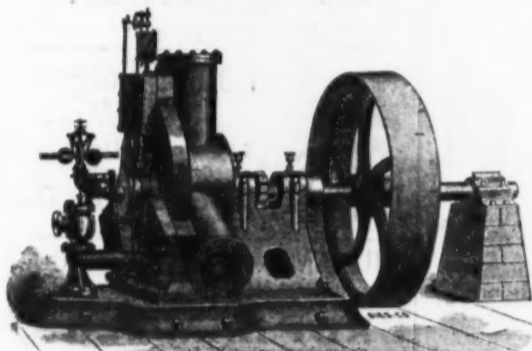
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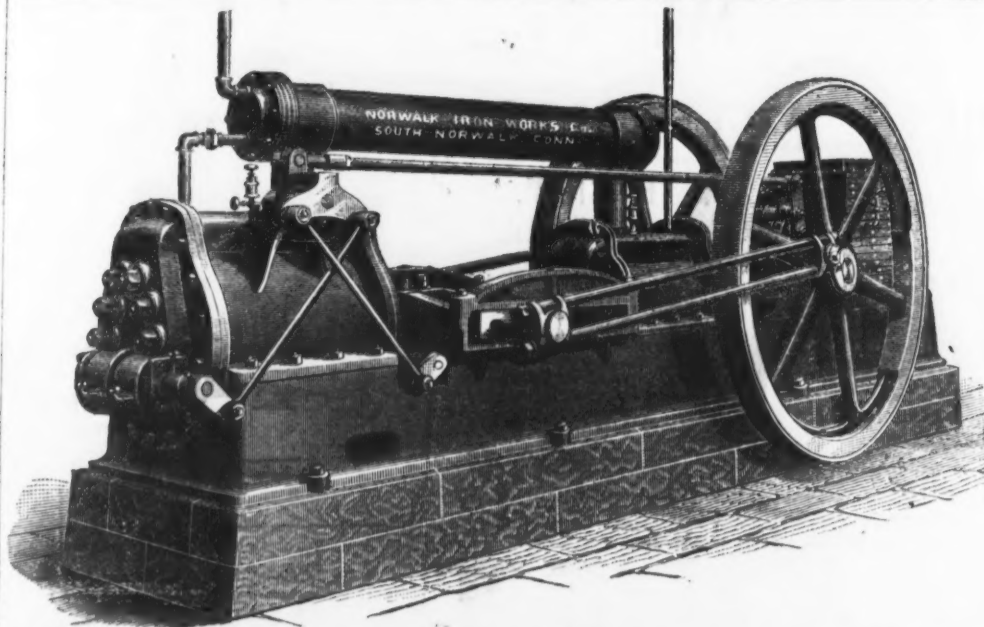
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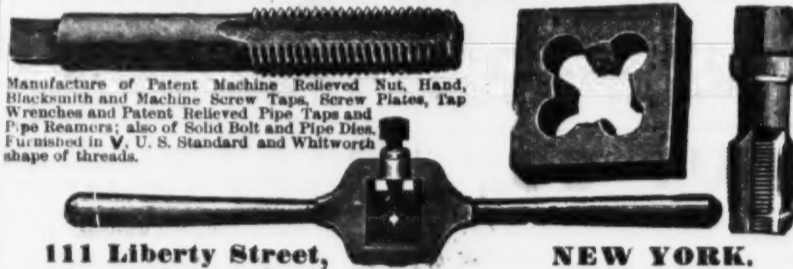
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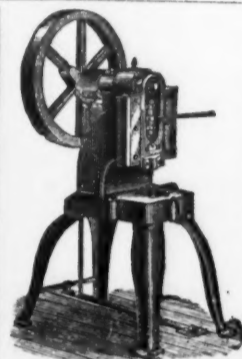
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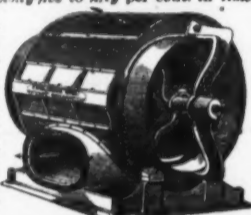


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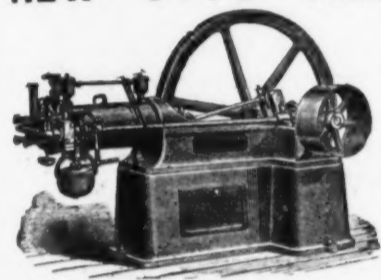
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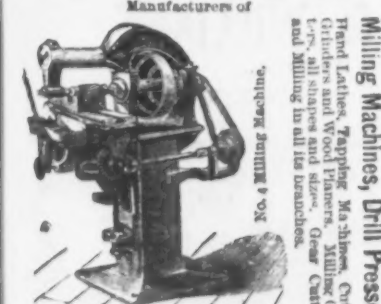
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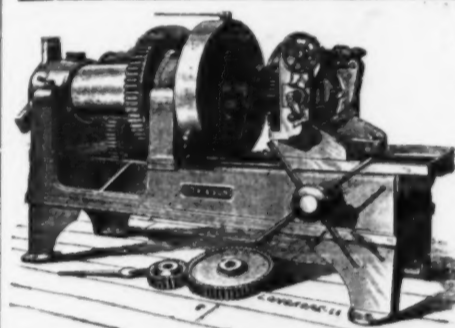
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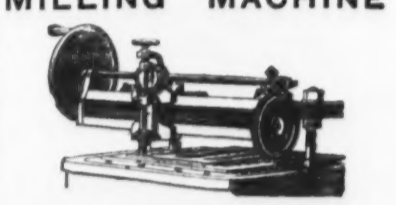
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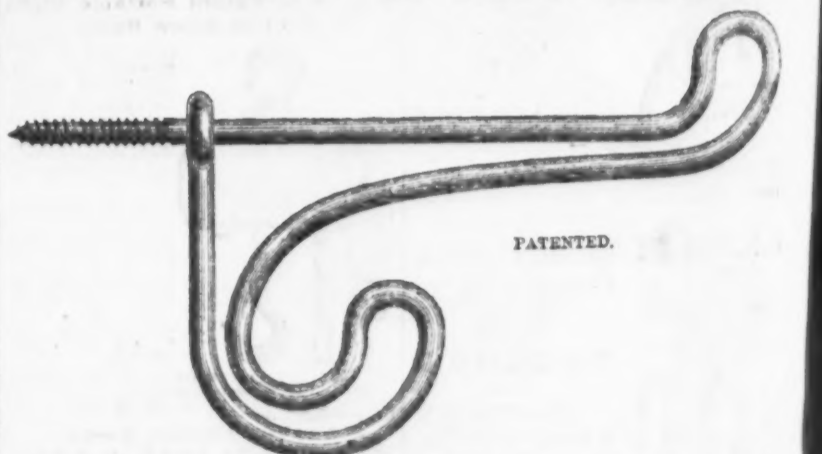
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